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WASTE ACCEPTANCE CRITERIA FOR THE WASTE ISOLATION PILOT PLANT

December 1991

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LIST OF ACRONYMS

Acronym	Definition
AEA	Atomic Energy Act
ALARA	As Low as Reasonably Achievable
ASME	American Society of Mechanical Engineers
C of C	Certificate of Compliance
CFR	Code of Federal Regulations
CH-TRU	Contact-Handled Transuranic
CIP	Characterize Initial Population
CSP	Characterize Statistical Population
DOE	U.S. Department of Energy
DOE/AL	DOE Field Office, Albuquerque
DOE/EM	DOE Headquarters Office of Environmental Restoration and Waste Management
DOE/WPIO	DOE WIPP Project Integration Office
DOE/WPSO	DOE WIPP Project Site Office
DOT	U.S. Department of Transportation
EEG	Environmental Evaluation Group
EPA	U.S. Environmental Protection Agency
FGE	Fissile Gram Equivalents
GVW	Gross Vehicle Weight
IDC	Item Description Code
LDR	Land Disposal Restrictions
LEL	Lower Explosive Limit
NIST	National Institute of Science and Technology (formerly the National Bureau of Standards)
NMED	New Mexico Environment Department
NMD	No-Migration Determination
NMVP	No-Migration Variance Petition
NQA	Nuclear Quality Assurance
NRC	U.S. Nuclear Regulatory Commission
OSW	Office of Solid Waste

LIST OF ACRONYMS
(CONTINUED)

Acronym	Definition
PA	Performance Assessment
PE-Ci	Plutonium Equivalent Curie
QA	Quality Assurance
QAP	Quality Assurance Program
QAPjP	Quality Assurance Project Plan
QAPP	Quality Assurance Program Plan for the Waste Isolation Pilot Plant Experimental-Waste Characterization Program
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RH-TRU	Remote-Handled Transuranic
RTR	Real-Time Radiography
SARP	Safety Analysis Report for Packaging
SNL	Sandia National Laboratories
SWB	Standard Waste Box
TRAMPAC	TRUPACT-II Authorized Methods for Payload Control
TRU	Transuranic
TRUCON	TRUPACT-II Content Codes Document
TRUPACT-II	Transuranic Package Transporter-II
TSD	Treatment, Storage, or Disposal
VOC	Volatile Organic Compound
WAC	Waste Acceptance Criteria
WACCC	Waste Acceptance Criteria Certification Committee
WAP	Waste Analysis Plan
WCPP	Waste Characterization Program Plan
WIPP	Waste Isolation Pilot Plant
WWIS	WIPP Waste Information System

EXECUTIVE SUMMARY

In 1978 and 1979, the Waste Acceptance Criteria (WAC) for the Waste Isolation Pilot Plant (WIPP) were initially developed by a U.S. Department of Energy (DOE) Steering Committee. The WAC Steering Committee generated a May 1980 report, WIPP-DOE-069, entitled "Report of the Steering Committee on TRU Waste Acceptance Criteria for the Waste Isolation Pilot Plant." The purpose of the WAC was to provide performance requirements to ensure public health and safety as well as the safe handling of transuranic (TRU) waste at the WIPP.

A series of revisions consistent with the intent of the original WIPP-DOE-069 were subsequently published to incorporate the results of ongoing project activities and the comments and suggestions from others. Revision 1, (September 1981) reflects consultations between the Environmental Evaluation Group (EEG) and the Albuquerque Operations Office WIPP Project. Revision 2, September 1985, reflected continued interactions with the EEG and other TRU program participants. Revision 3, January 1989, is the most current published update. Separate program documents have also been prepared in response to other requirements, such as those in the Resource Conservation and Recovery Act (RCRA) and the Transuranic Package Transporter-II (TRUPACT-II) Certificate of Compliance (C of C) from the U.S. Nuclear Regulatory Commission (NRC).

This Revision 4 of the WAC, WIPP-DOE-069, identifies and consolidates existing criteria and requirements which regulate the safe handling and preparation of TRU waste packages for transportation to and emplacement in the WIPP. This consolidation does not invalidate any existing certification of TRU waste to the WIPP Operations and Safety Criteria (Revision 3 of WIPP-DOE-069) and/or Transportation: Waste Package Requirements (TRUPACT-II Safety Analysis Report for Packaging [SARP]). Those documents being consolidated, including Revision 3 of the WAC, currently support the Test Phase.

Consolidation of the WAC into one document has resulted in several existing documents being superseded, as discussed in Section 1.0. The applicable RCRA and No-Migration Determination (NMD) requirements and performance assessment (PA) criteria are also included in this document.

The objective for consolidation is to provide the TRU waste generator and/or storage sites a summary of existing criteria and requirements and identification of those that are most restrictive for meeting compliance. This consolidation also furnishes guidance for preparation of deliverables necessary for full implementation of waste certification. These criteria and requirements must be met by waste generator and/or storage sites prior to shipping contact-handled (CH) and remote-handled (RH) TRU waste forms to the WIPP.

While some requirements and criteria are still being developed, this document defines all currently identified requirements and criteria for certification and acceptance of TRU waste at the WIPP. Future additions or revisions to this document may be necessary based on any RCRA requirements from the New Mexico Environment Department (NMED), and criteria based upon results of the WIPP PA studies.

The Waste Acceptance Criteria Certification Committee (WACCC) was established in 1985 to implement site waste certification activities for TRU waste to be emplaced in the WIPP.

The primary objectives of this document are to:

- Consolidate and clarify the WAC that need to be met to ensure the safe handling, preparation for transport, and emplacement of TRU waste in the WIPP.

- Specify the WAC requirements imposed by the RCRA for waste emplacement in the WIPP.

- Document the technical justification and/or regulatory requirements for the establishment of these revised/consolidated WAC.

The WIPP Project will comply with all applicable federal and state requirements and regulations, including those in Titles 10, 40, and 49 of the Code of Federal Regulations (CFR). These WAC apply to CH- and RH-TRU waste forms. These criteria and requirements will be reviewed and revised based on new technical or regulatory requirements. There will be a formal change control process for updating controlled copies of this document, WIPP-DOE-069. Revised pages will be supplied to all holders of controlled copies.

RESPONSIBILITIES

The responsibilities, as related to the WAC, of the organizations that approve this document, and those that implement these criteria are defined in detail in Section 2.0 and summarized in the following paragraphs and Figure 2-1.

DOE Headquarters

The DOE Headquarters Office of Environmental Restoration and Waste Management (DOE/EM), along with the DOE WIPP Project Integration Office (DOE/WPIO) and the DOE WIPP Project Site Office (DOE/WPSO), is responsible for the final approval of the WAC, and the Quality Assurance Program Plan (QAPP) for the WIPP Experimental Waste Characterization Program, along with any subsequent revisions of these documents.

DOE Field Office, Albuquerque

The DOE/EM has delegated responsibility for all operations involving TRU waste emplacement in the WIPP to the DOE Field Office, Albuquerque (DOE/AL). The DOE/AL is responsible for administering the program to demonstrate the safe disposal of radioactive wastes resulting from the defense activities and programs of the United States exempted from regulation by the NRC. The DOE/AL must meet all the requirements of a licensee as described in 10 CFR Part 71, under the general license provisions of 49 CFR § 173.471, as a registered owner of the TRUPACT-II or other transportation packaging.

DOE WIPP Project Integration Office

The DOE/AL administers the majority of the above responsibilities through the DOE/WPIO. The DOE/WPIO serves as the principal WIPP representative (with participation by the DOE/WPSO) to regulatory and oversight organizations. The DOE/WPIO directs, conducts, and coordinates the activities of the WACCC, which is a standing committee within the DOE/WPIO. The DOE/WPIO is responsible for publishing and distributing this document (WIPP-DOE-069). The DOE/WPIO is also responsible for administering the TRU waste characterization program for any waste to be emplaced in WIPP.

The DOE/WPIO, which includes the WACCC, has the authority to grant or suspend the TRU waste generator and/or storage sites' authority to certify waste to the WAC. Under DOE/WPIO, the WACCC consists of two separate groups: a technical support group and an audit and surveillance group. The technical support group is responsible, along with the DOE/WPSO, for the review of programs and activities at waste generator and/or storage sites that assure TRU wastes are certified for acceptance at WIPP. The WACCC audit and surveillance group is responsible, along with the

DOE/WPSO, for audits and/or surveillance at the waste generator/storage sites for compliance with their certification plans. Other functions and responsibilities of the DOE/WPIO are described in Section 2.0.

DOE WIPP Project Site Office

The DOE/WPSO, which reports to the DOE/WPIO, is responsible for all WIPP site activities. The DOE/WPSO directs, coordinates, and administers the activities necessary to assure that TRU waste accepted at WIPP is in compliance with all Federal, state, and local laws and regulations, and the WAC. Generation, approval, and submittal of all required site permit applications, including the Resource Conservation and Recovery Act TRU Mixed Waste Part B Application, Clean Air Act, and other permit applications are the responsibility of the DOE/WPSO. The DOE/WPSO, with the concurrence of the DOE/WPIO, is responsible for ensuring verification and quality assurance (QA) oversight of TRU waste certification operations, including waste characterization in accordance with the RCRA. Final waste acceptance authority is the responsibility of DOE/WPSO. Other functions and responsibilities of the DOE/WPSO are described in Section 2.0.

Waste Generator and/or Storage Sites

Waste generator and/or storage sites are responsible for preparing plans, including QA plans, that document the methods used by the sites to comply with each of the criteria/requirements. These shall include procedural, administrative and/or procurement controls. These plans are outlined in Table 2-1. These plans must include all activities pertaining to waste certification, preparation for transportation of waste packages, compliance with the RCRA, and fulfillment of PA requirements as appropriate. The waste generator and/or storage sites are responsible for the preparation of accurate data packages and assuring that the data packages match the payload shipped. The WAC requires sites to designate

waste package and transportation certification official(s). Other functions and responsibilities of the waste generator and/or storage sites are described in Section 2.0.

WIPP WASTE ACCEPTANCE CRITERIA AND REQUIREMENTS

The consolidated WIPP criteria and requirements are presented in Section 3.0. The DOE Order 5820.2A, "Radioactive Waste Management," requires that waste generator and/or storage sites must comply with these criteria and requirements for waste to be transported to and emplaced in the WIPP.

A summary of the WIPP WAC, identifying and highlighting the governing limits for each criteria or requirement, is provided in Section 3.1. These requirements and criteria are derived from the WIPP Operations and Safety Criteria, TRUPACT-II SARP Appendix 1.3.7, the WIPP RCRA requirements, and PA.

The WIPP WAC requirements and criteria specified in Section 3.0 are organized in five major headings: Waste Container, Waste Form, Waste Package, Data Package, and Other. There are then under each individual criterion six separate entries covering: WIPP Operations and Safety Criteria, Transportation: Waste Package Requirements, RCRA Requirements, Performance Assessment Criteria, Compliance, and Technical Justification.

WIPP Operations and Safety Criteria

These criteria were developed to ensure safe handling of wastes at the WIPP and were previously issued in Revision 3 of this document. The compliance criteria are structured to assist those responsible for the certification of TRU waste to prepare site-specific certification plans and detailed procedures to meet the WIPP WAC. Site certification plans and procedures incorporate process and

administrative controls, and may include tests on individual waste packages to accomplish certification. Sites are required to obtain DOE/WPIO and WACCC, as well as DOE/WPSO approval on certification and QA plans. Requests for exceptions to the Operational Safety Criteria must be formally submitted to the DOE/WPIO and WACCC for approval. No exceptions will be considered during the WIPP Test Phase.

Transportation: Waste Package Requirements

These are requirements from the C of C issued by the NRC, which references the TRUPACT-II SARP Appendix 1.3.7, "TRUPACT-II Authorized Methods for Payload Control (TRAMPAC)." Waste package requirements for RH-TRU wastes will not be finalized until the RH Cask SARP is approved by the NRC and a C of C is issued. Included in Section 3.0 are preliminary requirements derived from meetings with the NRC and the RH cask SARP currently being prepared for review by the DOE, prior to submittal to the NRC.

RCRA Requirements

Radioactive waste that contains hazardous constituents is designated mixed waste and is subject to dual regulation under the Atomic Energy Act (AEA) and the RCRA. A large fraction of DOE TRU waste contains hazardous materials regulated under the RCRA. In this document, "TRU waste" includes TRU-mixed waste.

The U.S. Environmental Protection Agency (EPA) has delegated authority to the NMED to administer the RCRA mixed-waste program at the WIPP. The NMED has incorporated the federal requirements into state hazardous waste regulations. Under this authorization, the NMED has the ability to promulgate additional regulations for the management of mixed waste. The NMED has not currently

proposed additional regulations for the mixed waste program. Future regulatory requirements, as applicable to the WAC, will be incorporated into this document as they are identified. For ease of reference at the various DOE facilities that must comply with the WAC, the federal citations are provided. Throughout the document, reference to federal regulations includes the analogous state regulations.

The RCRA regulations, as they apply to the WIPP, include Standards for the Owners/Operators of Treatment, Storage, or Disposal (TSD) facilities that are codified in 40 CFR Parts 264 and 265. These require the owner/operator to obtain a chemical and physical characterization of the waste, and ensure that the waste shipped to the facility is the waste specified on the shipping manifest. These RCRA requirements for the WIPP facility will be satisfied at the generator sites before shipment of waste to the WIPP. Applicable RCRA requirements to be met for each category of waste present at the site are described in the WIPP RCRA Part A and Part B Permit Applications, as well as in the NMD published by the EPA.

The WAC covering the RCRA relate to the requirements of the NMD published by the EPA and the WIPP RCRA Part A and Part B Permit Applications submitted to the NMED. These requirements are subject to change as permit conditions are issued by the NMED.

Performance Assessment Criteria

These are criteria for the characterization of waste used in the WIPP experimental waste program. The relationship between the Waste Characterization Program Plan (WCPP) for WIPP Experimental Waste, the test requirements, the Quality Assurance Program Plan for the WIPP Experimental Waste Characterization Program, and the generator and/or storage site Quality Assurance Project Plans (QAPjPs) is identified in this document (Figure 3-1). The WCPP summarizes the waste

characterization requirements for the bin-scale and alcove tests that are designed to evaluate gas generation rate and gas generation potential under expected repository conditions using TRU waste.

QUALITY ASSURANCE REQUIREMENTS

Section 4.0 defines the TRU waste certification Quality Assurance Program (QAP), per the requirements of the DOE Orders 5700.6C and 5820.2A. Sites must meet these requirements for all planned and systematic activities to provide adequate confidence that each site satisfies all requirements for acceptance and emplacement of waste in the WIPP.

The QA requirements are modeled after American Society of Mechanical Engineers (ASME) Quality Assurance Program Requirements for Nuclear Facilities (ASME NQA-1), DOE Order 5700.6C, and EPA's guidance document QAMS-005/80, as applicable. Each site must develop a QA plan that defines responsibilities, activities, and procedures which are applicable to the TRU waste certification. Each waste generator and/or storage site shall assure that their QA plan will allow only certified waste to be shipped to the WIPP. The QA requirements pertaining to transportation shall be addressed in site-specific TRAMPACs. The QA requirements pertaining to the RCRA and PA shall be addressed in the site-specific QAPjPs.

SUMMARY

The WAC document will serve as the primary directive for assuring safe handling, transportation, and emplacement of TRU waste in the WIPP. The identified criteria and regulatory requirements set forth strict parameters that must be met by waste generator and/or storage sites before these wastes are shipped to and emplaced in the WIPP facility. By combining all applicable criteria and regulatory requirements into one primary document, waste generators will find it easier to keep abreast of

pertinent guidelines. Table ES-1 summarizes the limiting conditions derived from all the criteria and requirements applicable for CH-TRU waste to be emplaced in the WIPP. In addition to implementation of all the criteria and regulatory requirements in this document, waste generator and/or storage sites will assure that waste to be emplaced in the WIPP will meet full regulatory compliance with any other applicable requirements. This document will be revised as new requirements or criteria are identified or as existing criteria and/or requirements need modification.

TABLE ES-1
SUMMARY OF WAC LIMITING PARAMETERS FOR CH-TRU WASTE

CRITERION/ REQUIREMENT AND SECTION	LIMITING PARAMETER(S)	SOURCE(S) OF LIMIT(S)
WASTE CONTAINER REQUIREMENTS/CRITERIA		
Waste Containers 3.2.1	• Containers shall be noncombustible and meet DOT Type A packaging requirements.	1
	• Current TRUPACT-II requirements limit acceptable containers to 55-gallon drums, standard waste boxes (SWBs), or SWB overpack of 55-gallon drums or test bins.	2
Waste Package Size 3.2.2	• Current TRUPACT-II limits are 55-gallon drums in two seven-packs, or two SWBs.	2
Waste Package Handling 3.2.3	• All packages shall be configured as specified in the TRUPACT-II SARP (see 3.2.2 above).	2
WASTE FORM REQUIREMENTS/CRITERIA		
Immobilization 3.3.1	• Waste materials shall be immobilized if >1% by weight is particulate material < 10 microns in diameter, or if >15% by weight is particulate material < 200 microns in diameter.	1
Liquids 3.3.2	• Only residual liquids; as a guideline, residual liquid in well-drained internal containers to be restricted to approximately 1 volume % of the internal container; aggregate amount of residual liquid < 1 volume % of external container.	1
Pyrophoric Materials 3.3.3	• No non-radionuclide pyrophorics permitted. Radionuclides in pyrophoric form are limited to <1% by weight in each waste package.	2,3
Explosives and Compressed Gases 3.3.4	• No explosives (49 CFR Part 173, Subpart C) are permitted.	1,2,3
	• No compressed gases are permitted.	2
TRU Mixed Wastes 3.3.5	• TRU wastes shall contain no hazardous wastes unless they exist as co-contaminants with transuranics.	1
	• Waste generators must determine if their waste is regulated by RCRA, and meet the requirements in the WIPP RCRA Part A and Part B Permit Applications.	3

TABLE ES-1 (CONT.)
SUMMARY OF WAC LIMITING PARAMETERS FOR CH-TRU WASTE

CRITERION/ REQUIREMENT AND SECTION	LIMITING PARAMETER(S)	SOURCE(S) OF LIMIT(S)
WASTE FORM REQUIREMENTS/CRITERIA (Continued)		
TRU Mixed Wastes (Cont.) 3.3.5	• Generators must document procedures for sampling, analytical protocols, QA/QC guidelines, and other information called for in 40 CFR § 264.13 and 265.13 in a site-specific QAPjP.	3
	• Characteristic ignitable (D001), corrosive (D002), and reactive (D003) wastes are not acceptable at WIPP.	1,2,3
	• Any waste container sent to WIPP or loaded into a bin destined for WIPP must meet the two times (2X) the maximum comparability requirement for 5 nonflammable VOCs as specified in the NMD.	3
	• Any waste container sent to WIPP must meet the ten times (10X) the average comparability requirement for 3 nonflammable VOCs as specified in the NMD.	3
	• Sludges shall be analyzed for total VOCs and toxic metals specified in the NMD.	3
Specific Activity of Waste 3.3.6	• Waste shall be greater than 100 nanocuries of TRU per gram of waste, exclusive of added shielding, rigid liners, and the waste containers, including alpha contaminated wastes handled as TRU under DOE Order 5820.2A.	1
WASTE PACKAGE REQUIREMENTS/CRITERIA		
Waste Package Weight 3.4.1	• Current waste package limits are 1000 lbs per 55-gallon drum, or 4000 lbs per SWB.	2
	• TRUPACT-II payload is limited to 7265 lbs.	2
	• TRUPACT-II is limited to 19,250 lbs total gross weight, with a total shipment GVW of 80,000 lbs.	2

TABLE ES-1 (CONT.)
SUMMARY OF WAC LIMITING PARAMETERS FOR CH-TRU WASTE

WASTE PACKAGE REQUIREMENTS/CRITERIA (Continued)

CRITERION/ REQUIREMENT AND SECTION	LIMITING PARAMETER(S)	SOURCE(S) OF LIMIT(S)
Nuclear Criticality (Pu-239 FGE) 3.4.2	• Accepted package limits, including two times the error, are: - < 200g/55-gallon drum - < 325g/SWB	2
	• The sum of the FGE of all packages in a TRUPACT-II payload shall be < 325g.	2
Pu-239 Equivalent Activity 3.4.3	• Waste packages shall not exceed 1000 Ci of Pu-239 equivalent activity (PE-Ci).	1
Surface Dose Rate 3.4.4	• Drums or SWBs shall not exceed 200 mrem/hr surface reading, or 10 mrem/hr at 2 m.	1,2
	• Shielded containers are allowed for ALARA purposes only.	2
	• Neutron contributions of >20 mrem/hr shall be separately documented.	1
	• External dose rates on the loaded TRUPACT-II shall not exceed 200 mrem/hr surface, or 10 mrem/hr at 2 m.	2
Removable Surface Contamination 3.4.5	• Removable package surface contamination shall not be >50 pCi/100 cm^2 alpha, and not >450 pCi/100 cm^2 beta/gamma.	1
Thermal Power 3.4.6	• Thermal (wattage) limits for individual waste packages, including the error, are contained in the TRUPACT-II SARP.	2
	• TRUPACT-II load limits are contained in the TRUPACT-II SARP.	2
	• TRUPACT-II design limit is 40 watts.	2

TABLE ES-1 (CONT.)
SUMMARY OF WAC LIMITING PARAMETERS FOR CH-TRU WASTE

WASTE PACKAGE REQUIREMENTS/CRITERIA (Continued)

CRITERION/ REQUIREMENT AND SECTION	LIMITING PARAMETERS(S)	SOURCE(S) OF LIMIT(S)
Gas Generation 3.4.7	• All confinement layers, such as bags, shall be closed only by a twist-and-tape or fold-and-tape method.	2
	• No sealed containers >1 gallon may be in the waste.	2
	• The maximum number of confinement layers shall be known.	2
	• Waste packages emplaced in WIPP during the experimental period shall not exceed 50% of the lower explosive limit in any layer of confinement for hydrogen and methane.	3
	• Total flammable VOCs are limited to 500 ppm in the headspace gas of waste packages.	2
	• If total flammable VOCs are >500 [illegible] adspace, a flame test must be performed pric[illegible] ment in the WIPP.	3
	• If total flamm[illegible] ppm in headspace, a Le Chatelier calc[illegible] as[illegible]y.	3
	• All chemicals/materials >1% by weight must be evaluated for compatibility within the waste form and with TRUPACT-II materials [illegible] construction.	2
	• Trace chemicals (<1 weight % limit) must total < 5% by weight of the waste in any package.	2
	• Chemicals/materials present in concentrations greater than one weight percent, shall conform to the allowable chemicals in each waste material type.	2
	• Real-time radiography or equivalent examination.	4
	• Visual characterization of solid waste for 10 waste material categories listed in QAPP.	4
	• Analysis of sludges for pH and major cations and anions listed in SNL Bin-Scale Test Plan.	4
	• Total alpha activity of waste on a container basis using methodology listed in QAPP.	4

TABLE ES-1 (CONT.)
SUMMARY OF WAC LIMITING PARAMETERS FOR CH-TRU WASTE

CRITERION/ REQUIREMENT AND SECTION	LIMITING PARAMETERS(S)	SOURCE(S) OF LIMIT(S)
WASTE PACKAGE REQUIREMENTS/CRITERIA (Continued)		
Gas Generation 3.4.7 (Cont.)	• All waste packages shipped in TRUPACT-II shall be vented with one or more filters that meet specifications listed in the TRUPACT-II SARP.	2
	• All rigid liners shall be punctured or vented.	2
Labeling 3.4.8	• A unique identification barcode label reasonably expected to last 10 years shall be affixed.	1,2
	• Each package shall have appropriate DOT labels.	1,2,3
	• Each package shall be marked with the shipping category.	2
DATA PACKAGE REQUIREMENTS/CRITERIA		
Data Package/ Certification 3.5.1	• A data package with certification shall be transmitted prior to shipment.	1
	• Documentation for certification of individual packages or a group of packages for shipment in each TRUPACT-II unit shall be submitted.	2
	• A hazardous waste manifest shall be utilized for each shipment of TRU mixed waste.	3
	• Information required by the WCPP shall be provided.	4
OTHER REQUIREMENTS/CRITERIA		
Additional Requirements 3.6.1	• All packages in a single TRUPACT-II shall belong to the same shipping category.	2
	• Each package shipped shall belong to one of the content codes defined in TRUCON.	2
	• Retrievably stored waste that has been unvented shall be vented and aspirated per the TRUPACT-II SARP.	2
	• Payload control procedures outlined in Section 7.4.3 of the TRUPACT-II SARP shall be followed.	2

Source(s) of Limit(s):

1 - WIPP Operations and Safety Criteria
2 - Transportation: Waste Package Requirements: TRAMPAC
3 - RCRA Requirements
4 - Performance Assessment Criteria

1.0 INTRODUCTION

In 1978 and 1979, the Waste Acceptance Criteria (WAC) for the Waste Isolation Pilot Plant (WIPP) were initially developed by a U.S. Department of Energy (DOE) Steering Committee. The WAC Steering Committee generated a May 1980 report, WIPP-DOE-069, entitled "Report of the Steering Committee on TRU Waste Acceptance Criteria for the Waste Isolation Pilot Plant." The purpose of the WAC was to provide performance requirements to ensure public health and safety as well as the safe handling of transuranic (TRU) waste at the WIPP.

A series of revisions consistent with the intent of the original WIPP-DOE-069 were subsequently published to incorporate the results of ongoing project activities and the comments and suggestions from others. Revision 1 (September 1981) reflected consultations between the Environmental Evaluation Group (EEG) and the Albuquerque Operations Office WIPP Project. Revision 2, September 1985, reflected continued interactions with the EEG and other TRU program participants. Revision 3, January 1989 (Reference 1), is the most current published update. Separate program documents have also been prepared in response to other requirements, such as those in the Resource Conservation and Recovery Act (RCRA) and the Transuranic Package Transporter-II (TRUPACT-II) Certificate of Compliance (C of C) from the U.S. Nuclear Regulatory Commission (NRC).

This revision (Revision 4.0) of the WAC document consolidates and clarifies the existing criteria and requirements for the safe handling, preparation for transportation, and emplacement of TRU waste in the WIPP. This consolidation does not invalidate any existing certification of TRU waste to the WIPP Operations and Safety Criteria (Revision 3 of WIPP-DOE-069) and/or Transportation: Waste Package Requirements (TRUPACT-II requirements).

The objective for consolidation is to provide the TRU waste generator and/or storage sites a summary of all existing criteria and requirements and identification of those that are most restrictive for meeting compliance. This consolidation also furnishes guidance for preparation of deliverables necessary for full implementation of waste certification. Those documents being consolidated, including Revision 3 of the WAC, currently support the Test Phase. The TRU waste from generator and/or storage sites must be certified as meeting these criteria and requirements prior to transport to the WIPP. "Criteria", as defined in this document, refers to limiting parameters specified by the DOE, while "requirements" refer to parameters imposed by regulations and statutes from external organizations (e.g., U.S. Environmental Protection Agency [EPA], NRC, New Mexico Environment Department (NMED), etc.).

This WAC document applies to contact-handled (CH) and remote-handled (RH) TRU waste forms to be emplaced in the WIPP. Requirements have not yet been finalized for the RH Cask but are included as guidance to waste generator and/or storage sites. Final requirements will be included after NRC approval of the RH Cask Safety Analysis Report for Packaging (SARP) and issuance of a C of C. Since additional criteria or requirements for both CH and RH waste may be developed based on the results of the performance assessment for the WIPP or additional regulatory requirements, this WAC will be revised as necessary.

Waste generator and/or storage sites need to certify their waste to the following four subsets, as discussed under each criterion/requirement in Section 3.0:

- WIPP Operations and Safety Criteria
- Transportation: Waste Package Requirements
- RCRA Requirements
- Performance Assessment (PA) Criteria.

Table 1-1 is a matrix of all elements related to the TRU waste certification process. Column three lists the documents that mandate the preparation of the deliverables. The fourth column describes the documentation/deliverables that the sites must prepare in support of certification. Transuranic waste has been divided into three general categories in the table based on the certification needs:

- Waste that will be used in the Bin-Scale or Alcove tests.
- Waste generated or retrieved from storage during but not part of the test phase.
- Waste generated or retrieved from storage during the disposal phase.

For each of these categories, the waste population is defined for which criteria or requirements must be verified prior to shipment and emplacement of TRU waste in the WIPP during the test and operational phases.

Sites will need to certify waste to all of the sets of criteria or requirements in Table 1-1, but this may not yet be practical because of present uncertainties in the No-Migration Determination (NMD) and other RCRA waste characterization requirements for the disposal phase. At a minimum, the initial certification must include certification to the Operations and Safety Criteria and the Transportation Requirements. This portion of the overall certification is to be designated as the "waste package certification". The remainder of the certification process involves criteria or requirements that are waste-stream specific. Prior to shipment for disposal in the WIPP, all certification requirements shall be met. For shipments between sites using WIPP controlled transportation packaging, only the transportation requirements apply.

All applicable state and federal regulations relating to the safe handling, preparation for transportation, and emplacement of TRU waste will apply to the WIPP.

TABLE 1-1
WASTE CERTIFICATION SUMMARY

CRITERIA/ REQUIREMENTS	(1) C/R	CONTROLLING DOCUMENTS	DOCUMENTS/ DELIVERABLES FROM EACH SITE	WASTE POPULATION FOR VERIFICATION					
				DURING TEST PHASE				DURING DISPOSAL PHASE	
				BIN/ALCOVE TESTS		WASTE NOT IN TESTS			
				RCRA	NON-RCRA	RCRA	NON-RCRA	RCRA	NON-RCRA
OPERATIONS AND SAFETY	C	WIPP WAC (DOE-WIPP-069, REVISION 4.0)	CERTIFICATION PLAN QA PLAN	All Waste	All Waste	All Waste	All Waste	All Waste	All Waste
TRANSPORTATION	R	TRAMPAC TRUCON CHEM. LIST C of C	SITE-SPECIFIC TRAMPAC (INCLUDES QA)	All Waste	All Waste	All Waste	All Waste	All Waste	All Waste
PA	C	WCPP QAPP	QAP/P	(2) CSP	CSP	(3) CIP	CIP	CSP	CSP
RCRA	R	WIPP PART B QAPP	QAP/P	CSP	N/A	CIP	N/A	CSP	N/A
(NMD ONLY)	R	WIPP PART B QAPP	QAP/P	CSP	CSP	CIP	CIP	CSP	CSP

(1) CRITERIA OR REQUIREMENTS, (2) CSP - CHARACTERIZE STATISTICAL POPULATION, (3) CIP - CHARACTERIZE INITIAL POPULATION

The criteria of Revision 3 of WIPP-DOE-069 (Reference 1) cover only the safe handling of TRU wastes at the WIPP. As explained above, Revision 4 consolidates into one document all the criteria and requirements to be met prior to the emplacement of TRU wastes in the WIPP:

- Documents superseded by this document (WIPP/DOE-069, Revision 4) are: Waste Acceptance Criteria for the Waste Isolation Pilot Plant, WIPP-DOE-069, Revision 3 (Reference 1); TRU Waste Certification Compliance Requirements for Acceptance of Newly Generated Contact-Handled Wastes to be Shipped to the Waste Isolation Pilot Plant, WIPP-DOE-114, Revision 2 (Reference 2); Quality Assurance Requirements for Certification of TRU Waste For Shipment to the Waste Isolation Pilot Plant, WIPP-DOE-120, Revision 2 (Reference 3); TRU Waste Certification Compliance Requirements for Acceptance of Contact-Handled Wastes Retrieved from Storage to be Shipped to the Waste Isolation Pilot Plant, WIPP-DOE-137, Revision 2 (Reference 4); Data Package Format for Certified TRU Waste for the Waste Isolation Pilot Plant, WIPP-DOE-157, Revision 2 (Reference 5); TRU Waste Certification Compliance Requirements for Remote-Handled Wastes for Shipment to the Waste Isolation Pilot Plant, WIPP-DOE-158, Revision 1 (Reference 6); and Quality Assurance Guidance for TRUPACT-II Payload Control, DOE/WIPP 89-007 (Reference 7).

- Documents not superseded, but referenced herein, include: The Quality Assurance Program Plan for the Waste Isolation Pilot Plant Experimental-Waste Characterization Program, Revision 1 (Reference 8); Safety Analysis Report for the TRUPACT-II Shipping Package (SARP), Revision 9 (Reference 9); Final Safety Analysis Report, Waste Isolation Pilot Plant, Carlsbad, New Mexico, WIPP Project 02-9, Revision 0 (Reference 10); Quality Assurance (QA) Plan for the Transportation and Receipt of Transuranic (TRU) Waste, DOE/WIPP 89-012 (Reference 11); and Waste Characterization Program Plan for Waste Isolation Pilot Plant Experimental Waste, DOE/WIPP 89-025, Revision 1 (Reference 12). If the requirements in these documents change, the later revisions of referenced documents shall have precedence over the values quoted in Section 3.0. The criteria and

requirements presented in Section 3.0 will be reviewed and revised based on new technical or regulatory requirements. There will be a formal change control process for updating controlled copies of this document WIPP-DOE-069. Revised pages will be supplied to all holders of controlled copies.

2.0 RESPONSIBILITIES

This section identifies the WAC-related responsibilities of the organizations that approve and oversee its implementation and the organizations to whom these WAC apply (Figure 2-1).

The DOE Headquarters Office of Environmental Restoration and Waste Management (DOE/EM) is responsible for interpretation of waste management policy reflected in all documentation supporting implementation of the program for certifying that TRU wastes meet the WIPP WAC. The DOE/EM also will approve both this document, WIPP-DOE-069, and the Quality Assurance Program Plan for the WIPP Experimental-Waste Characterization Program (QAPP) (Reference 8), along with any subsequent revisions of these documents.

The DOE/EM has delegated authority for all operations involving TRU waste emplacement in the WIPP to the DOE Field Office, Albuquerque (DOE/AL). The majority of these responsibilities have been redelegated to the DOE/AL WIPP Project Integration Office (DOE/WPIO). The DOE WIPP Project Site Office (DOE/WPSO), which reports to the DOE/WPIO, is responsible for all WIPP site activities. The DOE/WPIO has overall responsibility for the WAC, with concurrence from DOE/WPSO.

The DOE/WPIO and the Waste Acceptance Criteria Certification Committee (WACCC), which is a standing committee within the DOE/WPIO, are responsible for developing and maintaining the WAC. Under DOE/WPIO, the WACCC consists of two separate groups: a technical support group and an audit and surveillance group. The technical support group is responsible, along with the DOE/WPSO, for the review of programs and activities at waste generator and/or storage sites that assure TRU wastes are certified for acceptance at the WIPP. The WACCC audit and surveillance group is responsible, along with the DOE/WPSO, for audits and/or surveillance at the

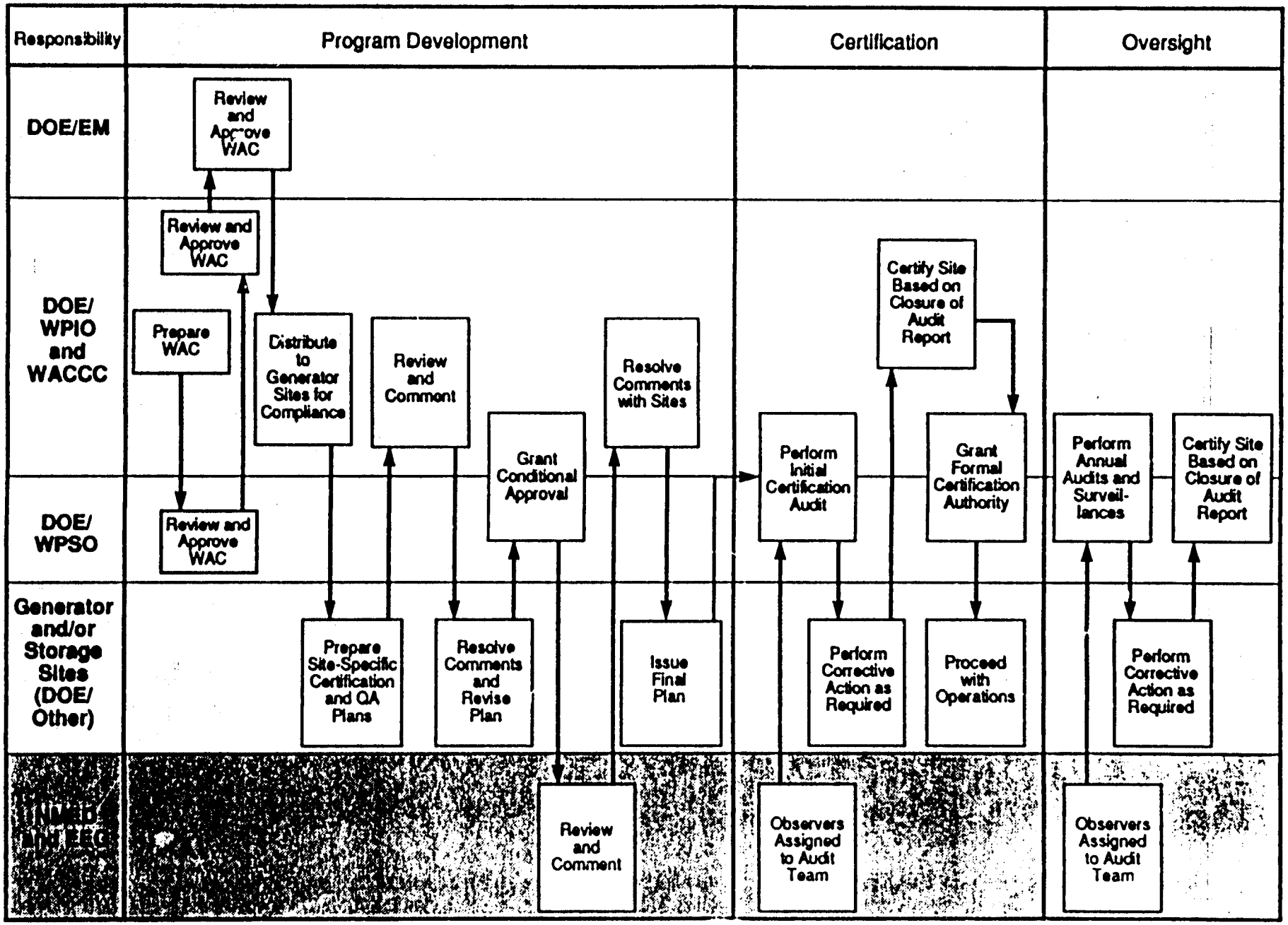

Figure 2-1. Waste Acceptance Criteria Certification Process Flowchart

waste generator/storage sites for compliance with their certification plans. Surveillance can include resident on-site WACCC personnel. Interfaces are maintained between the DOE/WPIO and the other DOE field offices responsible for TRU waste generator and/or storage site operations.

The responsibilities of the DOE/EM, DOE/AL, DOE/WPIO and the WACCC, DOE/WPSO, and waste generator and/or storage sites, as related to these WAC, are described in more detail in the following subsections.

2.1 DOE HEADQUARTERS

The DOE/EM along with the DOE/WPIO and DOE/WPSO are responsible for the final approval of the WAC, and the Quality Assurance Program Plan for the Waste Isolation Pilot Plant Experimental-Waste Characterization Program (Reference 8), along with any subsequent revisions of these documents.

2.2 DOE FIELD OFFICE, ALBUQUERQUE

The DOE/AL is responsible for administering the program to demonstrate the safe disposal of radioactive wastes resulting from the defense activities and programs of the United States exempted from regulation by the NRC. This responsibility encompasses all activities associated with the certification of TRU waste, verification of the proper use of approved transportation packaging for TRU waste, and the receipt and emplacement of waste in the WIPP. These responsibilities are included in the DOE Order 5820.2A (Reference 13).

The DOE/AL is registered as the owner of the TRUPACT-II under the general license provisions of the Code of Federal Regulations (CFR), specifically 49 CFR § 173.471 (Reference 14). As such, all the requirements of a licensee (as described in 10 CFR Part 71, Reference 15) apply for the

procurement, use, maintenance, repair, and any subsequent modifications to the TRUPACT-II. The NRC has issued to the DOE/AL a C of C (Reference 16) authorizing the use of the TRUPACT-II package design for the shipment of Type B quantities of radioactive material. The NRC will issue additional C of C(s) for other transportation packagings, as they are approved, and any amendments. The DOE/AL has delegated Fleet Management to DOE/WPIO.

The DOE/AL is responsible for the establishment of the WACCC per DOE Order 5820.2A (Reference 13).

2.3 DOE WIPP PROJECT INTEGRATION OFFICE

The DOE/WPIO serves as the principal WIPP representative (with participation by the DOE/WPSO) to regulatory and oversight organizations within and outside the State of New Mexico and assures compliance with all Consultation and Cooperation and working agreements between the State of New Mexico and the DOE.

The DOE/WPIO directs, conducts, and coordinates the activities of the WACCC and the activities associated with the development and maintenance of the WAC. The DOE/WPIO publishes this document (WIPP-DOE-069) and is responsible for distribution of changed pages to holders of controlled copies. The DOE/WPIO also provides Quality Assurance (QA) oversight over the WACCC audit function and approves the WACCC management plan, DOE/WIPP 90-004 (Reference 17).

The TRU waste characterization program for any waste to be emplaced in WIPP is administered by the DOE/WPIO.

As holder of the transportation packaging C of C, DOE/AL has delegated the responsibility to the DOE/WPIO to ensure that the activities of all users of the DOE controlled transportation packaging comply with requirements of the SARP and the C of C.

2.4 DOE WIPP PROJECT SITE OFFICE

The DOE/WPSO directs, coordinates, and administers the activities necessary to assure that TRU waste accepted at WIPP is in compliance with all Federal, state, and local laws and regulations, and the WAC. Appropriate compliance audits and surveillance activities will be performed by the DOE/WPSO.

The DOE/WPSO participates in the development and maintenance of the WAC and also participates in the activities of the WACCC.

Generation, approval, and submittal of all required site permit applications, including the Resource Conservation and Recovery Act TRU Mixed Waste Part B Permit Application, Clean Air Act, and other permit applications are the responsibility of the DOE/WPSO.

The DOE/WPSO also provides the WIPP site interface to the Environmental Protection Agency Region VI, the State of New Mexico Environment Department, and the New Mexico Environmental Evaluation Group.

The DOE/WPSO, with the concurrence of the DOE/WPIO, is responsible for ensuring verification and QA oversight of TRU waste certification operations, including waste characterization in accordance with the RCRA. In accordance with 40 CFR § 265.13 and 40 CFR Part 268 (Reference 18), the DOE/WPSO must obtain all the waste characterization information required to emplace the

waste. The DOE/WPSO Manager approves the QAPP and this document, and will approve any subsequent revisions. Final waste acceptance authority is the responsibility of DOE/WPSO.

2.5 WASTE CERTIFICATION

The DOE/WPIO, which includes the WACCC, has the authority to grant or suspend the TRU waste generator and/or storage sites' authority to certify waste to the WAC. The DOE/WPIO and the WACCC are responsible for developing and maintaining the Waste Acceptance Criteria. The steps required for waste certification are shown in Figure 2-1 and include:

- The internally approved site certification and QA plans are submitted to the DOE/WPIO and the WACCC for approval through the DOE Field/Area Office

- The WACCC technical support group reviews and evaluates the adequacy of the plans

- After resolution of any comments or concerns, the DOE/WPIO and the WACCC, and the DOE/WPSO, grant conditional approval

- The DOE/WPIO and the WACCC, and the DOE/WPSO, perform an initial certification audit

- The results of all these actions are considered prior to granting formal approval of these plans and granting certification authority

- The DOE/WPIO and the WACCC, and the DOE/WPSO, perform periodic audits and surveillances to ensure continuing compliance with the certification and QA plans.

The WACCC Chairperson is a DOE employee selected by the DOE/WPIO Project Director. The WACCC Chairperson reports to the Chief, Experimental Programs and Waste Integration Branch, who in turn reports to the DOE/WPIO Project Director.

The technical support group reviews and comments on site-specific certification plans, TRUPACT-II Authorized Methods for Payload Control (TRAMPAC), the Quality Assurance Project Plan (QAPjP), and associated QA plans. Based upon such reviews, recommendations are made to DOE/WPIO and the WACCC regarding approval or suspension of waste generator or storage sites' certification and/or transportation authority. The technical support group will also review, evaluate, and provide recommendations to the DOE/WPIO and the WACCC on any proposed criteria or requirement revisions.

The audit group performs the audits and surveillances of sites for implementation of, and compliance with, all certification and associated QA plans. This group initially performs certification audits at all DOE sites handling TRU waste to evaluate compliance with the WIPP Operations and Safety Criteria. Each site will also have an initial certification audit to assure compliance with the specific transportation waste package requirements. Upon successful completion of these audits, TRU waste package certification authority may be granted to the generator and/or storage site by the DOE/WPIO and the WACCC, and the DOE/WPSO. Prior to the granting of full certification authority so that a site may ship TRU waste for emplacement in the WIPP, the site will be audited against the site-specific QAPjP. Subsequent to each of the above initial audits, periodic reaudits and surveillances will be conducted at sites to assure proper operations. The DOE/WPIO and the WACCC are responsible for resolution with the generator and/or storage sites of all identified issues or concerns related to compliance with the WAC. Sites will transmit controlled copies of documents to the DOE/WPIO and the WACCC, and the DOE/WPSO after formal approval.

2.6 WASTE GENERATOR AND/OR STORAGE SITES

Waste generator and/or storage sites are responsible for preparing plans required for compliance with the WAC, and for certifying TRU waste in accordance with the authority granted by the DOE/WPIO and the WACCC, and the DOE/WPSO. These plans must include all activities pertaining to waste certification, preparation for transportation of waste packages, compliance with the RCRA, and fulfillment of PA criteria as appropriate. Methods of compliance with each criterion/requirement shall be documented or specifically referenced. These shall include procedural, administrative, and/or procurement controls. Generators of TRU waste are responsible for determining if the waste is a hazardous waste as defined under 40 CFR Part 261, Subparts C and D (Reference 18).

The DOE/WPSO assures regulatory compliance of waste and provides formal waste acceptance notification. The initial certified wastes to be received at the WIPP will be in experimental bins which will undergo acceptance tests (e.g., visual examination of the exterior of the bin) applicable only to bins. In the event a bin does not meet these special acceptance tests, the WIPP and the originating site shall have procedures and agreements in place for return of the waste.

All users of NRC-certified waste packaging are responsible for complying with the requirements of the specific SARP and C of C.

It is the responsibility of each waste generator and/or storage site to ensure that any activities that are subcontracted meet the applicable requirements specified by the WAC. Subcontracted activities shall be subject to audits by the waste generator/storage site or the DOE/WPIO and the WACCC, and the DOE/WPSO, as appropriate.

The WAC requires a site certification official to be designated who is responsible for documenting that all waste packages prepared for shipment to the WIPP meet all specified criteria. The WAC

also requires a transportation certification official to be responsible for documenting approval of the payload, including his/her signature. The transportation certification official's responsibilities include all transportation waste package requirements and records, and assurance that all parameters are met before the transportation packaging may be released for transport. At the option of the site, one person may fulfill both the site and transportation certification functions.

Table 2-1 is provided for guidance to summarize the various plans (deliverables) that must be provided by TRU waste generator and/or storage sites to complete the certification process. Subsequent to the internal DOE Field Office approval, these deliverables will be submitted to the DOE/WPIO and the WACCC, and the DOE/WPSO, for approval. As noted in Table 2-1, several of these deliverables can be issued either under one cover or under separate covers. In any case, these plans shall only include activities related to the WAC.

TABLE 2-1
CERTIFICATION DOCUMENTATION/DELIVERABLES

DOCUMENT/ DELIVERABLE	APPROVED BY	SCOPE	OVERSIGHT	RELATIONSHIP TO OTHER DOCUMENTS
CERTIFICATION PLAN	- DOE AT GENERATOR/ STORAGE SITE - DOE/WPIO AND WACCC - DOE/WPSO	DOCUMENTS METHODS OF COMPLIANCE FOR EACH WIPP OPERATIONS AND SAFETY CRITERIA	DOE/WPIO AND WACCC DOE/WPSO	MAY INCORPORATE THE SITE CERTIFICATION QA PLAN AND/OR THE SITE TRAMPAC
QA PLAN FOR CERTIFICATION	- DOE AT GENERATOR/ STORAGE SITE - DOE/WPIO AND WACCC - DOE/WPSO	DOCUMENTS APPLICATION OF DOE ORDER 5700.6C AND APPLICABLE ELEMENTS OF ASME NQA-1 TO THE CERTIFICATION PROCESS	DOE/WPIO AND WACCC DOE/WPSO	MAY BE INCORPORATED INTO THE CERTIFICATION PLAN. ALSO, MAY BE INCORPORATED WITH SITE TRAMPAC
SITE-SPECIFIC TRAMPAC (INCLUDES QA)	- DOE AT GENERATOR/ STORAGE SITE - DOE/WPIO AND WACCC - DOE/WPSO	DOCUMENTS METHODS OF COMPLIANCE WITH NRC REQUIREMENTS (TRAMPAC) FOR THE USE OF TRANSPORT PACKAGING	DOE/WPIO AND WACCC DOE/WPSO	MAY BE INCORPORATED INTO THE SITE CERTIFICATION PLAN OR COMBINED WITH THE QA PLAN
QUALITY ASSURANCE PROJECT PLAN (QAPjP)	- DOE AT GENERATOR/ STORAGE SITE - DOE/WPIO AND WACCC - DOE/WPSO	DOCUMENTS REQUIRED SITE-SPECIFIC WASTE SAMPLING AND ANALYTICAL PROTOCOLS, AND ASSOCIATED QA CONTROLS IN SUPPORT OF QAPP AND WCPP	DOE/WPIO AND WACCC DOE/WPSO	SUPPORTS THE QAPP, PROVIDING THE DETAILED METHODS AND PROCEDURES OF ACCOMPLISHING SPECIFIED SAMPLING AND ANALYSES

3.0 WIPP WASTE ACCEPTANCE CRITERIA AND REQUIREMENTS

Criteria and requirements have been identified that set forth strict parameters that must be met by generator and/or storage sites before TRU wastes may be transported to and emplaced in the WIPP. These criteria and requirements are derived from four sources: WIPP Operations and Safety, TRUPACT-II and proposed RH Cask Transportation, the RCRA, and the WIPP PA. Currently, all parameters necessary for full certification of CH-TRU waste have been defined. However, only preliminary transportation-associated waste package requirements for RH-TRU waste are identified in a draft RH Cask SARP. Specific RH-TRU waste transportation requirements will be defined when the RH Cask SARP receives approval by the NRC and a C of C is issued to the DOE.

Table 3-1 summarizes the limiting parameters derived from all of the applicable criteria and requirements which regulate the safe handling and preparation of CH-TRU waste packages for transportation to and emplacement in the WIPP. In this table, and throughout Section 3.0, the criteria and requirements are organized under five major headings: Waste Containers, Waste Form, Waste Package, Data Package, and Other.

3.1 SUMMARY OF WASTE ACCEPTANCE CRITERIA AND REQUIREMENTS

Table 3-2 and the remainder of Section 3.0 are included to assist generator and/or storage sites in preparing site specific plans and detailed procedures needed for certifying TRU wastes for transport to and emplacement in the WIPP. These site specific plans and procedures shall contain details of the waste handling, processes and controls, techniques, tests, and other actions needed to be applied to each waste package and/or waste stream/form. Methods of compliance to each of the criteria/requirements shall be documented or specifically referenced. These shall include procedural, administrative and/or procurement controls. The QA requirements applicable to certification are presented and discussed in Section 4.0. The resultant documented data from the plans and procedures form the information base for verifying that waste packages sent to the WIPP are certified by the responsible certifying official(s) as meeting all the WIPP criteria and requirements.

TABLE 3-1
SUMMARY OF WAC LIMITING PARAMETERS FOR CH-TRU WASTE

CRITERION/ REQUIREMENT AND SECTION	LIMITING PARAMETER(S)	SOURCE(S) OF LIMIT(S)
WASTE CONTAINER REQUIREMENTS/CRITERIA		
Waste Containers 3.2.1	• Containers shall be noncombustible and meet DOT Type A packaging requirements.	1
	• Current TRUPACT-II requirements limit acceptable containers to 55-gallon drums, standard waste boxes (SWBs), or SWB overpack of 55-gallon drums or test bins.	2
Waste Package Size 3.2.2	• Current TRUPACT-II limits are 55-gallon drums in two seven-packs, or two SWBs.	2
Waste Package Handling 3.2.3	• All packages shall be configured as specified in the TRUPACT-II SARP (see 3.2.2 above).	2
WASTE FORM REQUIREMENTS/CRITERIA		
Immobilization 3.3.1	• Waste materials shall be immobilized if >1% by weight is particulate material < 10 microns in diameter, or if >15% by weight is particulate material < 200 microns in diameter.	1
Liquids 3.3.2	• Only residual liquids; as a guideline, residual liquid in well-drained internal containers to be restricted to approximately 1 volume % of the internal container; aggregate amount of residual liquid < 1 volume % of external container.	1
Pyrophoric Materials 3.3.3	• No non-radionuclide pyrophorics permitted. Radionuclides in pyrophoric form are limited to <1% by weight in each waste package.	2,3
Explosives and Compressed Gases 3.3.4	• No explosives (49 CFR Part 173, Subpart C) are permitted.	1,2,3
	• No compressed gases are permitted.	2
TRU Mixed Wastes 3.3.5	• TRU wastes shall contain no hazardous wastes unless they exist as co-contaminants with transuranics.	1
	• Waste generators must determine if their waste is regulated by RCRA, and meet the requirements in the WIPP RCRA Part A and Part B Permit Applications.	3

TABLE 3-1 (CONT.)
SUMMARY OF WAC LIMITING PARAMETERS FOR CH-TRU WASTE

WASTE FORM REQUIREMENTS/CRITERIA (Continued)

CRITERION/ REQUIREMENT AND SECTION	LIMITING PARAMETER(S)	SOURCE(S) OF LIMIT(S)
TRU Mixed Wastes (Cont.) 3.3.5	• Generators must document procedures for sampling, analytical protocols, QA/QC guidelines, and other information called for in 40 CFR § 264.13 and 265.13 in a site-specific QAPjP.	3
	• Characteristic ignitable (D001), corrosive (D002), and reactive (D003) wastes are not acceptable at WIPP.	1,2,3
	• Any waste container sent to WIPP or loaded into a bin destined for WIPP must meet the two times (2X) the maximum comparability requirement for 5 nonflammable VOCs as specified in the NMD.	3
	• Any waste container sent to WIPP must meet the ten times (10X) the average comparability requirement for 3 nonflammable VOCs as specified in the NMD.	3
	• Sludges shall be analyzed for total VOCs and toxic metals specified in the NMD.	3
Specific Activity of Waste 3.3.6	• Waste shall be greater than 100 nanocuries of TRU per gram of waste, exclusive of added shielding, rigid liners, and the waste containers, including alpha contaminated wastes handled as TRU under DOE Order 5820.2A.	1

WASTE PACKAGE REQUIREMENTS/CRITERIA

Waste Package Weight 3.4.1	• Current waste package limits are 1000 lbs per 55-gallon drum, or 4000 lbs per SWB.	2
	• TRUPACT-II payload is limited to 7265 lbs.	2
	• TRUPACT-II is limited to 19,250 lbs total gross weight, with a total shipment GVW of 80,000 lbs.	2

TABLE 3-1 (CONT.)
SUMMARY OF WAC LIMITING PARAMETERS FOR CH-TRU WASTE

WASTE PACKAGE REQUIREMENTS/CRITERIA (Continued)

CRITERION/ REQUIREMENT AND SECTION	LIMITING PARAMETER(S)	SOURCE(S) OF LIMIT(S)
Nuclear Criticality (Pu-239 FGE) 3.4.2	• Accepted package limits, including two times the error, are: - < 200g/55-gallon drum - < 325g/SWB	2
	• The sum of the FGE of all packages in a TRUPACT-II payload shall be < 325g.	2
Pu-239 Equivalent Activity 3.4.3	• Waste packages shall not exceed 1000 Ci of Pu-239 equivalent activity (PE-Ci).	1
Surface Dose Rate 3.4.4	• Drums or SWBs shall not exceed 200 mrem/hr surface reading, or 10 mrem/hr at 2 m.	1,2
	• Shielded containers are allowed for ALARA purposes only.	2
	• Neutron contributions of >20 mrem/hr shall be separately documented.	1
	• External dose rates on the loaded TRUPACT-II shall not exceed 200 mrem/hr surface, or 10 mrem/hr at 2 m.	2
Removable Surface Contamination 3.4.5	• Removable package surface contamination shall not be >50 pCi/100 cm^2 alpha, and not >450 pCi/100 cm^2 beta/gamma.	1
Thermal Power 3.4.6	• Thermal (wattage) limits for individual waste packages, including the error, are contained in the TRUPACT-II SARP.	2
	• TRUPACT-II load limits are contained in the TRUPACT-II SARP.	2
	• TRUPACT-II design limit is 40 watts.	2

TABLE 3-1 (CONT.)
SUMMARY OF WAC LIMITING PARAMETERS FOR CH-TRU WASTE

WASTE PACKAGE REQUIREMENTS/CRITERIA (Continued)

CRITERION/ REQUIREMENT AND SECTION	LIMITING PARAMETERS(S)	SOURCE(S) OF LIMIT(S)
Gas Generation 3.4.7	• All confinement layers, such as bags, shall be closed only by a twist-and-tape or fold-and-tape method.	2
	• No sealed containers >1 gallon may be in the waste.	2
	• The maximum number of confinement layers shall be known.	2
	• Waste packages emplaced in WIPP during the experimental period shall not exceed 50% of the lower explosive limit in any layer of confinement for hydrogen and methane.	3
	• Total flammable VOCs are limited to 500 ppm in the headspace gas of waste packages.	2
	• If total flammable VOCs are >500 ppm in headspace, a flame test must be performed prior to emplacement in the WIPP.	3
	• If total flammable VOCs are >500 ppm in headspace, a Le Chatelier calculation is necessary.	3
	• All chemicals/materials >1% by weight must be evaluated for compatibility within the waste form and with TRUPACT-II materials of construction.	2
	• Trace chemicals (<1 weight % limit) must total < 5% by weight of the waste in any package.	2
	• Chemicals/materials present in concentrations greater than one weight percent, shall conform to the allowable chemicals in each waste material type.	2
	• Real-time radiography or equivalent examination.	4
	• Visual characterization of solid waste for 10 waste material categories listed in QAPP.	4
	• Analysis of sludges for pH and major cations and anions listed in SNL Bin-Scale Test Plan.	4
	• Total alpha activity of waste on a container basis using methodology listed in QAPP.	4

TABLE 3-1 (CONT.)
SUMMARY OF WAC LIMITING PARAMETERS FOR CH-TRU WASTE

CRITERION/ REQUIREMENT AND SECTION	LIMITING PARAMETERS(S)	SOURCE(S) OF LIMIT(S)
WASTE PACKAGE REQUIREMENTS/CRITERIA (Continued)		
Gas Generation 3.4.7 (Cont.)	• All waste packages shipped in TRUPACT-II shall be vented with one or more filters that meet specifications listed in the TRUPACT-II SARP.	2
	• All rigid liners shall be punctured or vented.	2
Labeling 3.4.8	• A unique identification barcode label reasonably expected to last 10 years shall be affixed.	1,2
	• Each package shall have appropriate DOT labels.	1,2,3
	• Each package shall be marked with the shipping category.	2
DATA PACKAGE REQUIREMENTS/CRITERIA		
Data Package/ Certification 3.5.1	• A data package with certification shall be transmitted prior to shipment.	1
	• Documentation for certification of individual packages or a group of packages for shipment in each TRUPACT-II unit shall be submitted.	2
	• A hazardous waste manifest shall be utilized for each shipment of TRU mixed waste.	3
	• Information required by the WCPP shall be provided.	4
OTHER REQUIREMENTS/CRITERIA		
Additional Requirements 3.6.1	• All packages in a single TRUPACT-II shall belong to the same shipping category.	2
	• Each package shipped shall belong to one of the content codes defined in TRUCON.	2
	• Retrievably stored waste that has been unvented shall be vented and aspirated per the TRUPACT-II SARP.	2
	• Payload control procedures outlined in Section 7.4.3 of the TRUPACT-II SARP shall be followed.	2

Source(s) of Limit(s):

1 - WIPP Operations and Safety Criteria
2 - Transportation: Waste Package Requirements: TRAMPAC
3 - RCRA Requirements
4 - Performance Assessment Criteria

TABLE 3-2
SUMMARY OF WASTE ACCEPTANCE CRITERIA AND REQUIREMENTS[1]

WASTE CONTAINER REQUIREMENTS/CRITERIA

WAC Criterion/ Requirement & Section	CH or RH	WIPP Operations and Safety Criteria	Transportation: Waste Package Requirements: TRAMPAC/RH-Cask[2]	RCRA Requirements	Performance Assessment Criteria
Waste Containers 3.2.1	CH	***Type A, Noncombustible***	***55-gal drums, SWBs, or SWB Overpack of 55-gal Drums or Test Bin***	No Additional Requirements	Same as Transportation
	RH	***Type A, Noncombustible***	***RH Canister***	No Additional Requirements	None
Waste Package Size 3.2.2	CH	Maximum dimension specified	***55-gal Drums in Two Seven Packs, or Two SWBs***	None	Same as Transportation
	RH	***RH Canister***	RH Canister	None	None
Waste Package Handling 3.2.3	CH	Drum and Box Handling Attachments	***Seven Packs, or SWBs***	None	No Additional Requirements
	RH	***Axial Pintle***	Axial Pintle	None	None

WASTE FORM REQUIREMENTS/CRITERIA

WAC Criterion/ Requirement & Section	CH or RH	WIPP Operations and Safety Criteria	Transportation: Waste Package Requirements: TRAMPAC/RH-Cask[2]	RCRA Requirements	Performance Assessment Criteria
Immobilization 3.3.1	CH & RH	***≤ 1% Below 10 Microns, ≤15% Below 200 Microns***	None	No Additional Requirements	Same as WIPP Operation
Liquids 3.3.2	CH & RH	***Only Residual Liquids (see definitions in Section 3.3.2.1)***	< 1 Volume Percent	No Additional Requirements	< 1 Volume Percent
Pyrophoric Materials 3.3.3	CH & RH	≤ 1% Radionuclides, No Non-Radionuclide Pyrophorics	***< 1% Radionuclides, No Non-Radionuclide Pyrophorics***	***See Section 3.3.5.3***	Same as Transportation
Explosives and Compressed Gases 3.3.4	CH & RH	Not Permitted, 49 CFR 173 Subpart C and G	***Explosives and compressed gases are not permitted***	***See Section 3.3.5.3***	No Additional Requirements
TRU Mixed Wastes 3.3.5	CH & RH	***Hazardous Waste must be Reported***	***Corrosives are not permitted***	***WIPP RCRA Parts A & B Permit Applications, WAP, NMD***	No Additional Requirements
Specific Activity of Waste 3.3.6	CH	***> 100nCi/g TRU***	Same as WIPP Operations	None	Same as WIPP Operations
	RH	***> 100nCi/g TRU ≤ 23 Ci/liter total***	Same as WIPP Operations	None	Same as WIPP Operations

1 - Limiting parameters are shown in bold italics, and are the basis for Table 3-1.
2 - RH Cask limits have not been finalized.

TABLE 3-2 (CONT.)
SUMMARY OF WASTE ACCEPTANCE CRITERIA AND REQUIREMENTS[1]

WASTE PACKAGE REQUIREMENTS/CRITERIA

WAC Criterion/ Requirement & Section	CH or RH	WIPP Operations and Safety Criteria	Transportation: Waste Package Requirements: TRAMPAC/RH-Cask[2]	RCRA Requirements	Performance Assessment Criteria
Waste Package Weight 3.4.1	CH	< 21,000 lbs	***1000 lbs per drum, 4000 lbs per SWB, 7265 lbs per TRUPACT-II payload 19,250 lbs per TRUPACT-II, 80,000 lbs GVW (DOT)***	None	None
	RH	***< 8,000 lbs***	RH-Cask TBD	None	None
Nuclear Criticality (Pu-239 FGE) 3.4.2	CH	See List in 3.4.2.1	***< 200 g/drum, < 325 g/SWB, or < 325 g/TRUPACT-II***	None	Same as Transportation
	RH	≤ 600 g	***< 325 g/cask***	None	Same as Transportation
Pu-239 Equivalent Activity 3.4.3	CH & RH	***≤ 1000 PE-Ci/ package***	None	None	None
Surface Dose Rate 3.4.4	CH	***≤ 200 mrem/hr***	***≤ 200 mrem/hr, DOT Package Limits, and Shielded Packages per SARP***	None	Same as WIPP Operations
	RH	***95% ≤ 100 rem/hr. 5% ≤ 1000 rem/hr.***	RH-Cask TBD and DOT Package Limits	None	None
Removable Surface Contamination 3.4.5	CH & RH	***≤ 50 pCi/100 cm² alpha, ≤ 450 pCi/100 cm² beta-gamma***	None	None	Same as WIPP Operations
Thermal Power 3.4.6	CH	No Limit Report if >0.1 watts/ft³	***Refer to Limits in TRUPACT-II SAR Section 1.2.3.3***	None	Same as Transportation
	RH	***≤ 300 watts/canister***	RH-Cask TBD	None	None
Gas Generation 3.4.7	CH	Vented	***TRAMPAC Limits; See requirements in Section 3.4.7.2, ≤ 500 ppm Flammable VOCs; Chemical compatibility study; all trace chemicals < 5 weight percent***	NMD Requirements Apply	***SNL Test Plan***
	RH	Vented	RH-Cask TBD	None	Same as CH
Labeling 3.4.8	CH	***ID Number, DOT***	***ID Number and Waste Shipping Category***	Same as DOT	None
	RH	***ID Number, DOT***	RH-Cask TBD	TBD	None

1. Limiting parameters are shown in bold italics, and are the basis for Table 3-1.
2. RH Cask limits have not been finalized.

TABLE 3-2 (CONT.)
SUMMARY OF WASTE ACCEPTANCE CRITERIA AND REQUIREMENTS[1]

WAC Criterion/ Requirement & Section	CH or RH	WIPP Operations and Safety Criteria	Transportation: Waste Package Requirements: TRAMPAC/RH-Cask[2]	RCRA Requirements	Performance Assessment Criteria
DATA PACKAGE REQUIREMENTS/CRITERIA					
Data Package/ Certification 3.5.1	CH	***Certification, WWIS Information, Data Format***	***Tables 13.1 to 13.3 in Appendix 1.3.7 (TRAMPAC)***	***Hazardous Waste Manifest per 40 CFR Part 262 NMD and QAPP Requirements***	***PA Data Package, QAPP Requirements***
	RH	***Certification, WWIS Information, Data Format***	RH-Cask TBD	TBD	None
OTHER REQUIREMENTS/CRITERIA					
Additional Requirements 3.6.1	CH	None	***One Shipping Category per TRUPACT-II, Authorized TRUCON Content Codes, Waste Aspirated per SARP, Payload Control Procedures***	Regulations or Permit Conditions as Determined by NMED	None
	RH	None	RH-Cask TBD	TBD	None

1 - Limiting parameters are shown in bold italics, and are the basis for Table 3-1.
2 - RH Cask limits have not been finalized.

Under each criterion or requirement in Sections 3.2 to 3.6, there are six separate entries covering: WIPP Operations and Safety Criteria, Transportation: Waste Package Requirements, RCRA Requirements, Performance Assessment Criteria, Compliance, and Technical Justification.

Revisions of requirements in referenced documents not controlled by the DOE (e.g., EPA, NRC, NMED) shall have precedence over the values quoted here and will be incorporated in future revisions of the WIPP WAC. There will be a formal change control process for updating controlled copies of this document, WIPP-DOE-069. Revised pages will be supplied to all holders of controlled copies.

Requests for exceptions to the WIPP Operations and Safety criteria can be formally submitted to the DOE/WPIO and WACCC for approval; however, exceptions will not be considered for the test phase. The WACCC cannot approve exceptions to requirements that are controlled by others, such as the NRC for transportation or the EPA and the NMED for the RCRA component of the mixed waste.

3.1.1 WIPP OPERATIONS AND SAFETY CRITERIA

These are the criteria developed to ensure safe handling of wastes at the WIPP. They were previously issued in WIPP-DOE-069, Revision 3 (Reference 1). Each site shall prepare a certification plan identifying how the site will ensure compliance with these criteria. The associated QA requirements shall be incorporated as quality control measures into the technical compliance activities.

3.1.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

Acceptable methods for compliance are given in the TRUPACT-II SARP (Reference 9), Appendix 1.3.7 (TRUPACT-II Authorized Methods for Payload Control [TRAMPAC]). For the use of TRUPACT-II, each site shall prepare a technical plan (site-specific TRAMPAC) identifying how the site will ensure compliance with each payload parameter. This technical plan shall contain sufficient detail to allow reviewers to understand and evaluate the compliance methodology for each payload parameter. The associated QA requirements shall be incorporated as Quality Control (QC) measures

into the technical compliance activities. The QA and technical plans (separately or combined) shall be submitted to the DOE/WPIO, the WACCC, and the DOE/WPSO for review and comment.

The sites shall develop their plans by preparing implementing procedures, which are written for technical and on-site QA verification activities. When the procedures are implemented, the site-specific TRUPACT-II payload program shall be audited by the DOE/WPIO and WACCC, and the DOE/WPSO. A site shall not transport waste in TRUPACT-II until its compliance program has successfully passed an initial audit, and written approval has been granted by the DOE/WPIO and WACCC, and the DOE/WPSO. Periodic re-audits shall be performed, and the DOE/WPIO and WACCC have the authority to revoke transport authority if nonconformances are detected.

Waste package requirements for transportation of RH-TRU wastes will not be finalized until the RH Cask SARP is approved by the NRC and a C of C is issued. Preliminary criteria are included in Table 3-2 and Sections 3.2 through 3.6 which are derived from initial meetings with the NRC and the RH Cask SARP, currently under preparation for review by the DOE prior to submittal to the NRC.

3.1.3 RCRA REQUIREMENTS

This section summarizes the applicable RCRA requirements for TRU mixed waste compliance with the WIPP RCRA Part A and Part B Permit Applications (References 19 and 20). TRU waste is classified as TRU mixed waste if it contains hazardous constituents as defined in 40 CFR Part 261 (Reference 18). Because of the presence of hazardous waste, mixed waste is subject to dual regulation under the Atomic Energy Act (AEA) (Reference 21) and the RCRA (Reference 18).

The EPA has delegated authority to the State of New Mexico to administer the RCRA mixed waste program. The NMED administers the program for the state and has incorporated the federal requirements into state hazardous waste regulations. Under this authorization, the NMED has the ability to promulgate additional regulations for the management of TRU mixed waste. The NMED has not currently proposed additional regulations for the TRU mixed waste program. Future regulatory requirements, if applicable to the WAC, will be incorporated into this document as they are identified.

The RCRA regulations, as they apply to the WIPP, include Standards for the Owners/Operators of Treatment, Storage, or Disposal (TSD) facilities that are codified in 40 CFR Parts 264 and 265. These require the owner/operator to obtain a chemical and physical characterization of the waste, and ensure that the waste shipped to the facility is the waste specified on the shipping manifest. These RCRA requirements for the WIPP facility will be satisfied at the generator sites before transport of waste to the WIPP. Applicable RCRA requirements to be met for each category of waste present at the site are described in the WIPP RCRA Part A and Part B Permit Applications as well as in the NMD published by the EPA.

Hazardous waste determinations are required by the RCRA for the purpose of manifesting waste for transportation, for waste management activity reports, and for ensuring adequate protection of human health and the environment. The manifest requirements are discussed in detail under the Data Package section (Section 3.5).

The DOE submitted a No-Migration Variance Petition (NMVP, Reference 22) to the EPA Office of Solid Waste (OSW) and has been granted a conditional NMD (Reference 23) for a period of ten years for testing and experimentation purposes. In the NMD, the EPA/OSW has presented several requirements for additional waste characterization data. The NMD requirements have been included in the WIPP RCRA Part B Permit Application, submitted to the NMED, and are included under the RCRA section in Table 3-1.

The primary reference document for establishing the RCRA waste characterization requirements included in the WAC is the WIPP Waste Analysis Plan (WAP). The DOE provided information in the WAP to the EPA/OSW and the NMED on available characterization data for the waste to be emplaced in the WIPP. These data were used in the NMVP and subsequently in the WIPP RCRA Part B Permit Application. Sites may use process knowledge and/or sampling and analysis to characterize the hazardous component of their wastes. In addition, each site must characterize a statistically representative sample of its waste to demonstrate that it meets the requirements of the NMD (Reference 23). Sampling and analysis activities shall be detailed in the site Quality Assurance Project Plans.

Waste generator and/or storage sites have the responsibility for collecting data that will be used to comply with the NMD. Headspace gas samples shall be collected and analyzed in accordance with procedures specific in each site's QAPjP. Sludges shall be analyzed for total volatile organic compounds (VOCs) and toxic metals specified in the WAP contained in the WIPP RCRA Part B Permit Application (Reference 20). No sampling and analysis procedures currently exist for VOCs and toxic metals in TRU sludges. The QAPP (Reference 8) contains a more detailed explanation of responsibilities for various organizations involved in the waste characterization programs.

3.1.4 PERFORMANCE ASSESSMENT CRITERIA

The PA waste characterization criteria, from the bin-scale (References 24 and 25) and alcove test plans (Reference 26), are summarized in the "Waste Characterization Program Plan for the WIPP Experimental Waste (WCPP)", DOE/WIPP 89-025 (Reference 12). For the waste generated or retrieved from storage during but not part of the test phase, the following criteria must be satisfied for a statistical population of packages:

- Real-time radiography or equivalent examination
- Radionuclide assay for total alpha activity
- Headspace analysis for inorganic and organic gases
- Visual examination of the waste
- Analysis of sludges for pH and major cations and anions.

The relationship between the WCPP, the QAPP, the Sandia National Laboratories (SNL) Test Plan Requirements, and the generator and/or storage site procedures and QAPjPs is shown in Figure 3-1.

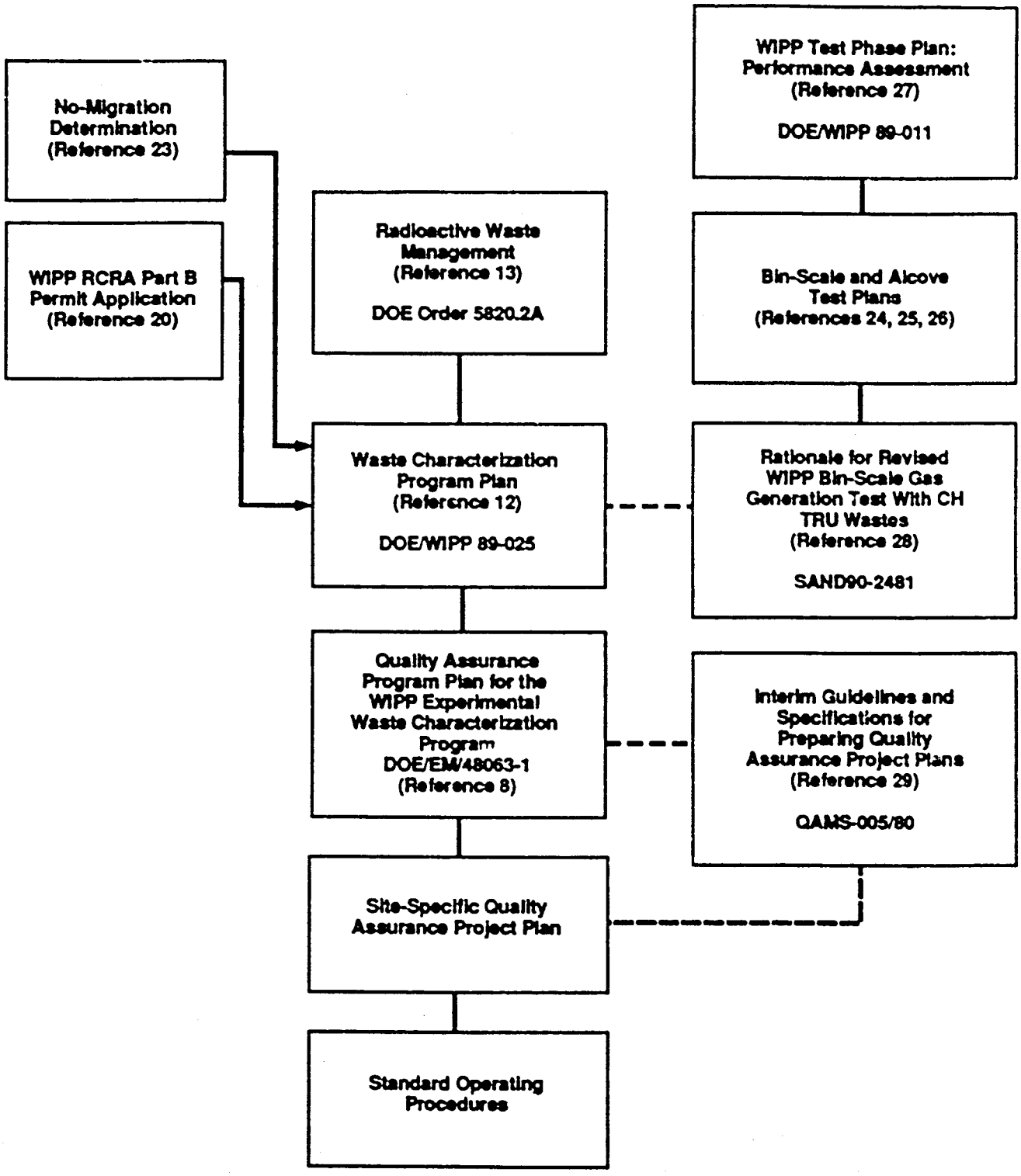

Figure 3-1. Documents Governing Waste Characterization

3.2 WASTE CONTAINER REQUIREMENTS/CRITERIA

3.2.1 WASTE CONTAINERS

3.2.1.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled Waste

Waste containers for emplacement in the WIPP shall be noncombustible and meet all applicable requirements of 49 CFR § 173.412 (Reference 14) for Type A packaging. Waste containers of various sizes, shown to meet Department of Transportation (DOT) Type A requirements by methods detailed in MLM 3245 (Reference 30) are acceptable at the WIPP. In addition, waste containers shall be used, handled and stored in a manner that is expected to maintain their Type A packaging specification from the time of certification to emplacement in the WIPP.

Remote-Handled Waste

Remote-handled TRU waste containers shall be noncombustible and meet, as a minimum, the structural requirements and design conditions for Type A packaging as contained in 49 CFR § 173.412. In addition, all RH-TRU waste containers shall be certified to the WIPP-approved specifications and shall be used, handled and stored in a manner that is expected to maintain their Type A packaging specification from the time of certification to emplacement in the WIPP.

3.2.1.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

Standard 55-gallon (208-L) metal drums, standard waste boxes (SWB), 55-gallon drums overpacked in a SWB, and an experimental bin overpacked in a SWB are authorized for shipment of CH-TRU waste in TRUPACT-II.

RH Cask Requirements

Only an RH canister is approved.

3.2.1.3 RCRA REQUIREMENTS

No additional requirements.

3.2.1.4 PERFORMANCE ASSESSMENT CRITERIA

Same as Transportation: Waste Package Requirements (Section 3.2.1.2 above).

3.2.1.5 COMPLIANCE

The Type A provisions for newly generated waste may be ensured by procurement or fabrication documentation. Waste packages retrieved from storage must be examined to demonstrate that the material type and thickness, physical size, and other physical attributes of the package meet applicable Type A requirements. A waste container can also be verified as a Type A packaging by subjecting a typical waste container to tests as specified in 49 CFR § 173.461. An inspection is required to ensure that the waste container is noncombustible.

Generator and/or storage sites shall ensure that their conditions of container use, handling, and storage are expected to maintain the Type A specification. Sites shall package the waste in a manner to maintain the Type A specification of the waste container.

3.2.1.6 TECHNICAL JUSTIFICATION

Past experience in the TRU waste program has shown that Type A packages provide adequate assurance of worker health and safety under the normal conditions of waste package handling and storage. The receipt of a Type A package at WIPP is expected to provide adequate time for interim storage at DOE sites and test phase activities at the WIPP to ensure that the package can be

retrieved in a contamination-free condition after the test period. The noncombustible requirement for the waste containers is to ensure that any fire would not propagate to another waste container.

For shipment in the TRUPACT-II package or the RH Cask, waste containers must meet the specifications in the respective SARPs.

3.2.2 WASTE PACKAGE SIZE

3.2.2.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled Waste

CH-TRU waste packages or package assemblies shall not exceed 12 x 8 x 8.5 feet (3.7 x 2.4 x 2.6 m) in overall L x W x H dimensions.

Remote-Handled Waste

RH-TRU waste packages (RH canisters) shall be no larger than a nominal 26 inches (0.66 m) in diameter with a maximum length of 10 feet, 1 inch (3.1 m), including the pintle, per Westinghouse WID Operation Drawing H-2-91273 (Reference 31).

3.2.2.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

Standard 55-gallon metal drums in two seven-pack configurations or two SWBs are the only currently authorized loading configurations for shipment in TRUPACT-II. An experimental bin or up to four drums may be overpacked in a SWB. If only one seven-pack or SWB of waste is scheduled for shipment in TRUPACT-II, a dunnage seven-pack or SWB must be added to the TRUPACT-II for transport, as specified in Appendix 1.3.7 of the TRUPACT-II SARP (Reference 9).

RH Cask Requirements

RH canister.

3.2.2.3 RCRA REQUIREMENTS

None.

3.2.2.4 PERFORMANCE ASSESSMENT CRITERIA

Same as transportation.

3.2.2.5 COMPLIANCE

CH-TRU waste packages or package assemblies shall not exceed the above dimensions. No CH-TRU waste package shall be smaller than a 55-gallon drum or equivalent waste container. Documentation shall be available to show that the RH-TRU waste container is fabricated to the dimensions specified in the RH-TRU waste container design criteria (Reference 31) and drawing H-2-91273.

3.2.2.6 TECHNICAL JUSTIFICATION

The maximum size of CH-TRU waste packages in the WIPP is limited by access to the waste hoist and the size of the waste hoist cage. Existing packages of CH-TRU waste that meet the criterion in Section 3.2.2.1 are:

- Standard 55-gal. (208-L) metal drum (DOT Spec. 17C and 17H)
- Standard 55-gal. (208-L) metal drum (DOT Spec. 6M)
- Rectangular metal box (74.4 X 50.5 X 38.5 in. LWH)
- Rectangular metal box (68 X 54 X 38.5 in. LWH)
- Rectangular metal box (88 X 54 X 54 in. LWH)
- Rectangular metal box (71 X 57 X 52.5 in. LWH)
- Rectangular metal box (50.4 X 58.4 X 72.4 in. LWH)

- Rectangular metal box (4 x 4 x 7 ft. LWH)
- Standard waste box (37 in. high x 71 in. long OD/54.25 in. short OD x 45.06 in. side).

The TRUPACT-II limits the CH-TRU waste containers to 55-gallon drums, or SWBs. Other acceptable waste containers may be added in the future.

The RH-TRU waste package size is based on the handling of an overpacked RH canister in the WIPP transfer cask.

3.2.3 WASTE PACKAGE HANDLING

3.2.3.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled Waste

All waste packages shall be provided with cleats, offsets, chimes, skids or 7-pack handling fixture for handling by means of fork trucks, cranes, or similar handling devices. Lifting rings and other auxiliary lifting devices on the waste packages, if provided, shall be recessed, offset, or hinged in a manner which does not inhibit stacking the waste packages.

Remote-Handled Waste

RH-TRU waste packages shall be equipped with an axial lifting pintle of a design acceptable to the WIPP (Drawing H-2-91273). The waste packages shall have no other lifting devices.

3.2.3.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

All 55-gallon drums will be seven packed and the SWBs shall be configured as specified in the TRUPACT-II SARP (Reference 9).

RH Cask Requirements

The WIPP RH canister configured with the axial lifting pintle shall be used.

3.2.3.3 RCRA REQUIREMENTS

None.

3.2.3.4 PERFORMANCE ASSESSMENT CRITERIA

No additional requirements.

3.2.3.5 COMPLIANCE

Existing CH-TRU waste containers will be inspected to show that they have acceptable handling fixtures. New CH-TRU waste containers shall be fabricated to documented specifications incorporating standard or WIPP approved handling fixtures, having a 5:1 safety factor ratio based on the ultimate strength of the material used for the lifting attachments. All RH-TRU waste containers shall be fabricated to documented design criteria incorporating the approved handling fixture.

3.2.3.6 TECHNICAL JUSTIFICATION

When loading and unloading TRUPACT-II, an overhead crane will be used. The WIPP waste handling system is designed to use slip sheets, fork trucks, and special seven-pack handling fixtures. The WIPP Hot Cell Facility is designed to handle standardized RH-TRU waste packages and will handle them only in a vertical orientation. The pintle is described in the RH canister user's manual and in Drawing H-2-91273. All RH-TRU containers must be cylindrical, smooth sided, and have no protrusions that would hinder the insertion or removal from the various casks, etc.

3.3 WASTE FORM REQUIREMENTS/CRITERIA

3.3.1 IMMOBILIZATION

3.3.1.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled and Remote-Handled Waste

Powders, ashes, and similar particulate waste materials shall be immobilized if more than 1 weight percent of the waste matrix in each package is in the form of particles below 10 microns in diameter, or if more than 15 weight percent is in the form of particles below 200 microns in diameter.

3.3.1.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

None.

RH Cask Requirements

None.

3.3.1.3 RCRA REQUIREMENTS

No additional requirements.

3.3.1.4 PERFORMANCE ASSESSMENT CRITERIA

Same as WIPP Operations and Safety Criteria, Section 3.3.1.1.

3.3.1.5 COMPLIANCE

Documented evidence or procedures shall exist to show that the waste form does not exist in excess of the above limits as packaged. For wastes capable of forming particulates, there shall exist documented evidence or analysis showing the stability and durability of the waste during the period between packaging and emplacement in the WIPP. As a minimum, generators will provide a letter report supporting their conclusion on compliance with this criteria. Durability is the resistance of waste particles to abrade into smaller particles during anticipated handling and transportation. Stability is the resistance of a waste to degrade into smaller particles as a function of time.

3.3.1.6 TECHNICAL JUSTIFICATION

The 200-micron limit was selected because smaller particles are easily dispersed. Particles below the 10-micron range are within the respirable range and could result in a radiation dose if inhaled. These limits will minimize the quantity of radioactive material that is available for dispersion or inhalation in the event of the failure of a waste package.

3.3.2 LIQUIDS

3.3.2.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled and Remote-Handled Waste

Liquid waste will not be emplaced in the WIPP. TRU waste for emplacement in the WIPP shall contain as little residual liquid as is reasonably achievable. All internal containers (e.g., bottles, cans, etc.) must be well-drained, but may contain residual liquids. As a guideline, residual liquid in well-drained containers will be restricted to approximately one percent of the volume of the internal container. In no case shall the total liquid equal or exceed one volume percent of the waste container (e.g., drum or SWB).

Definitions:

Residual Liquid - Liquids in quantities of less than one volume percent of the waste container that result from: liquid residues remaining in well-drained internal containers; condensation of moisture; and liquid separation resulting from sludge or resin settling.

Well-Drained Container - An internal rigid container, such as a bottle or can, in which liquid has been removed by pouring, pumping, or otherwise removing as much liquid as possible. The actual quantity of liquid remaining in well-drained containers will vary depending upon the viscosity of the liquid and the type and size of the internal rigid container. As a guideline, residual liquid in well-drained containers will be restricted to approximately one percent of the volume of the internal container. Plastic bags that contain individual waste items (e.g., combustibles, filters, metal, etc.), are not considered to be rigid containers. The total volume of residual liquid in a non-rigid container is considered to be contained by the waste container (e.g., 55-gallon drum, SWB). The sum of all liquids will be less than one percent of the volume of the waste container.

3.3.2.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

Waste for shipment in TRUPACT-II shall contain less than 1 volume percent of the waste container as liquids.

RH Cask Requirements

Same as TRUPACT-II requirements. (This requirement is anticipated based on initial negotiations with the NRC, but will not be finalized until review is complete and a C of C is issued.)

3.3.2.3 RCRA REQUIREMENTS

No additional requirements.

3.3.2.4 PERFORMANCE ASSESSMENT CRITERIA

All TRU waste containers for the WIPP Test Phase shall contain less than one volume percent liquids.

3.3.2.5 COMPLIANCE

The liquid criterion described in this section is applicable to waste generated or retrieved from storage. Each DOE facility managing TRU wastes destined for the WIPP must also satisfy this criterion.

Newly Generated Waste

Each DOE site should aggressively pursue a best management practice to minimize the presence of liquids in all TRU waste forms.

Retrievably-Stored Waste

Real-Time Radiography (RTR) or visual examination shall be used at DOE facilities to determine the presence and quantity of liquids in TRU wastes. Although some differences exist between the RTR equipment sensitivity at DOE sites, all facilities shall be able to certify TRU waste using RTR in accordance with the less than one volume percent liquid criterion for the external waste container. The RTR records shall include a description of the location of any liquid that is detected (e.g., between rigid liner and 55-gallon poly bag liner or within a one-gallon poly bottle) and an estimate of its volume.

3.3.2.6 TECHNICAL JUSTIFICATION

The prohibition against the presence of liquids is based on limiting the release of contaminated liquids if a container failed during handling or emplacement operations. This restriction also guards against any adverse effects these liquids might have on the structural integrity of the waste containers during the retrieval period (accelerated corrosion, etc.). Although personnel radiological exposures would be low, decontamination activities in salt could be difficult. By eliminating or minimizing the amount of liquids, the radiological impacts of a ruptured container are limited.

3.3.3 PYROPHORIC MATERIALS

3.3.3.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled and Remote-Handled Wastes

Pyrophoric materials, other than radionuclides, shall be rendered safe by mixing them with chemically stable materials (e.g., concrete, glass) or shall be processed to remove their hazardous properties. Not more than one percent by weight of the waste in each waste container may be pyrophoric forms of radionuclides, and these shall be generally dispersed in the waste.

3.3.3.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

Pyrophoric materials, other than radionuclides, shall be rendered chemically safe by processing prior to being placed in the waste container. Less than one percent by weight of the waste in each waste container may be pyrophoric forms of radionuclides.

RH Cask Requirements

Same as TRUPACT-II requirements. (These are preliminary requirements based on meetings with the NRC and the SARP to be submitted for approval.)

3.3.3.3 RCRA REQUIREMENTS

Addressed in TRU Mixed Wastes Section 3.3.5.3.

3.3.3.4 PERFORMANCE ASSESSMENT CRITERIA

Same as Transportation: Waste Package Requirements (Section 3.3.3.2 above).

3.3.3.5 COMPLIANCE

Documented procedures or evidence shall exist to show that the waste package contains no non-radionuclide pyrophorics and no significant quantities of radionuclide pyrophorics (<1 weight percent) or other wastes that could become pyrophoric compounds because of mixing. The one-percent limitation on radionuclides is to allow any minor residues of uranium or plutonium that may remain in an unoxidized state in the waste. Wastes that are expected to contain any metallic radionuclides are to be treated (oxidized) to eliminate as much of the potential pyrophorics as possible, prior to placement in waste containers. A validated process that converts pyrophoric compounds to a nonpyrophoric form can be used to meet this criterion. This process may either change the chemical form of the pyrophoric material or mix and bind it within an inert matrix.

3.3.3.6 TECHNICAL JUSTIFICATION

The restriction on pyrophorics in the waste is to minimize the potential for an ignition source in a waste package. The pyrophoric limitation for waste in the TRUPACT-II is a requirement of the C of C (Reference 16).

The waste forms being produced at the waste generating facilities may include small quantities of transuranic metals in pyrophoric form (i.e., primarily small dust-like particles in the form of TRU contamination). These pyrophoric forms of the transuranic metals are relatively uniformly dispersed throughout the waste packages, thereby rendering the material safe.

Studies at the Rocky Flats Plant (Reference 32) have shown that small quantities of pyrophoric plutonium can be accommodated in other nonpyrophoric materials without an unacceptable hazard. A 1-percent limit has been established in the criteria for the WIPP as an acceptable level of pyrophoric material in a transuranic waste package. The 1 percent is used instead of 3 percent since TRU waste forms may not be as uniform or homogeneous as the materials in the Rocky Flats Plant study.

The quantity of these materials is further limited by:

- The criticality limits associated with the individual waste packages or shipping configuration, i.e., <200 grams of Pu-239 fissile gram equivalent (FGE) for a 55-gallon drum or <325 grams of Pu-239 FGE for a SWB or a loaded TRUPACT-II.

- The wattage (thermal power) limits for the individual waste container and the loaded TRUPACT-II.

3.3.4 EXPLOSIVES AND COMPRESSED GASES

3.3.4.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled and Remote-Handled Waste

Transuranic waste shall contain no explosives or compressed gases. 49 CFR Part 173 Subpart C (Reference 14) defines explosives and 49 CFR Part 173 Subpart G defines compressed gases.

3.3.4.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

Explosives or pressurized containers are not permitted.

RH Cask Requirements

Explosives or pressurized containers are not permitted.

3.3.4.3 RCRA Requirements

Addressed in Section 3.3.5.3.

3.3.4.4 PERFORMANCE ASSESSMENT CRITERIA

No additional criteria.

3.3.4.5 COMPLIANCE

Documented procedures or RTR verifications are used to ensure that individual waste packages contain no pressurized vessels. Documented procedures are also used to exclude explosive items, compounds, or combination of materials that could form explosive compounds within the waste package. If such materials are present, they must be treated or diluted such that a detonation is not possible.

3.3.4.6 TECHNICAL JUSTIFICATION

These materials, if contained in a waste package, present a hazard to operating personnel during shipment and handling and are a potential source for failure of the waste container.

3.3.5 TRU MIXED WASTES

3.3.5.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled Waste

Transuranic wastes shall contain no hazardous wastes unless they exist as co-contaminants with transuranics. Waste packages containing hazardous waste shall be identified with the appropriate DOT label. All TRU-contaminated corrosive, reactive, and ignitable materials shall be treated to remove the hazardous characteristic. Hazardous wastes to be reported are listed in 40 CFR 261, Subparts C and D (Reference 18).

Remote-Handled Waste

Transuranic wastes shall contain no hazardous wastes unless they exist as co-contaminants with transuranics. All TRU-contaminated corrosive, reactive, and ignitable materials shall be neutralized and rendered nonhazardous. Hazardous waste to be reported are listed in 40 CFR 261, Subparts C and D (Reference 18).

3.3.5.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

Aqueous materials which have a pH less than 2 or more than 12.5 per 40 CFR 261.22(a)(1) are prohibited from the wastes (Reference 18).

RH Cask Requirements

Aqueous materials which have a pH less than 2 or more than 12.5 per 40 CFR 261.22(a)(1) (Reference 18) are prohibited from the wastes. (These are preliminary requirements based on meetings with the NRC and the SARP to be submitted for approval.)

3.3.5.3 RCRA REQUIREMENTS

RCRA - Waste Determination

Generators of TRU waste must determine whether their waste is regulated by RCRA as a hazardous waste. The determination is based on whether representative samples or process knowledge of the solid waste indicates that it is specifically identified or listed in 40 CFR Part 261 (Reference 18). Each hazardous waste must be assigned one or more of the applicable EPA hazardous waste codes. Only those waste codes included in the WIPP RCRA Part A Permit Application (Reference 19) can be managed at the WIPP. Wastes that exhibit the characteristics of Ignitability (D001), Corrosivity (D002), or Reactivity (D003), as defined in 40 CFR 261 (Reference 18), will not be accepted at the WIPP.

WIPP RCRA Permit Application Requirements and QAPjPs

The WAP included in the WIPP RCRA Part B Permit Application (Reference 20) specifies the waste analysis requirements applicable to the TRU mixed wastes to be shipped to WIPP. These include the specific sampling and analysis requirements specified in the NMD issued by the EPA. The QAPP (Reference 8) addresses analysis and sampling requirements to show compliance with the NMD criteria. The QAPjP establishes site-specific procedures for sampling and analytical protocols and QA/QC guidances for the WIPP Test Phase. The additional information required by 40 CFR § 265.13 and 264.13 (Reference 18), such as test methods, sampling methods, frequency, and accuracy, are required to be addressed in the site-specific QAPjPs.

Waste generator and/or storage sites have the responsibility for sampling and analyzing headspace gases to demonstrate compliance with the waste characterization requirements in the NMD. The headspace gas samples shall be collected and analyzed in accordance with procedures specific in each site's QAPjP. The QAPP (Reference 8) contains a more detailed explanation of responsibilities for various organizations involved in the waste characterization program. The waste characterization requirements of the NMD (Reference 23) are:

Headspace Gases

- **Flammability**

  See Section 3.4.7.3 for requirements.

- **Nonflammable VOCs (Comparability)**

  - The NMD (Reference 23) mandates that any waste package that is sent to the WIPP must meet the requirement that the headspace concentration within a package does not exceed two times (2X) the maximum concentration for five nonflammable VOCs. This requirement is designed to ensure that the wastes to be emplaced in the WIPP are in fact similar to the wastes described in the NMVP (Reference 22). The five nonflammable VOCs are:

  - Carbon Tetrachloride
  - Methylene Chloride
  - 1,1,1-Trichloroethane
  - Trichloroethylene
  - 1,1,2-Trichloro-1,2,2-trifluoroethane.

  - The five nonflammable compounds and their 2X maximum concentration limits are reported in the NMD (Reference 23) and the WAP in the WIPP RCRA Part B Permit Application (Reference 20), and the methodology for demonstrating compliance is presented in the QAPP (Reference 8).

- **Nonflammable VOCs (No-Migration Demonstration)**

  - The NMD (Reference 23) mandates that any waste package that is sent to the WIPP must meet the requirement that the headspace concentration within a package does not exceed ten times (10X) the average concentration of three nonflammable VOCs.

(Two of the five compounds listed above do not have to meet this requirement.) The three nonflammable VOCs that must meet the requirement are:

- **Carbon Tetrachloride**
- **Methylene Chloride**
- **Trichloroethylene.**

- **The three nonflammable compounds and their 10X average concentration are reported in the NMD (Reference 22) and the WAP in the WIPP RCRA Part B Permit Application (Reference 20), and the methodology for demonstrating compliance is presented in the QAPP (Reference 8).**

Sludges

In addition to the headspace analyses specified above, sludges shall be analyzed for total VOCs and toxic metals specified in the WAP for the WIPP RCRA Part B Permit Application (Reference 20). Sampling and analysis procedures for VOCs and toxic metals in TRU sludges are being developed and, when completed, the requirements will be included in the QAPP (Reference 8).

3.3.5.4 PERFORMANCE ASSESSMENT CRITERIA

No additional requirements.

3.3.5.5 COMPLIANCE

The types and quantities of hazardous wastes must be entered in the data package (Section 3.5.1.1). This information must be consistent with the acceptable EPA hazardous waste codes for WIPP as specified in the RCRA Part A Permit Application (Reference 19).

The basis for the identification of the hazardous wastes will be process knowledge supplemented with sampling.

3.3.5.6 TECHNICAL JUSTIFICATION

Transuranic mixed waste is defined as TRU waste that contains constituents considered hazardous in accordance with 40 CFR Part 261 (Reference 18). Because of the presence of hazardous constituents, the waste is subject to dual regulation under the AEA (Reference 21) and the RCRA (Reference 18). Dual regulation has made it necessary to make a RCRA hazardous waste determination for the purposes of manifesting for transportation, for reporting waste management activities, and for ensuring adequate health and safety programs. The DOE Order 5400.3 (Reference 33) requires the implementation of and compliance with the RCRA regulations.

Waste characterization data or other determinations made about the disposition of the waste shall be maintained for necessary audits.

3.3.6 SPECIFIC ACTIVITY OF WASTE

3.3.6.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled Waste

For purposes of TRU waste certification, the lower limit of >100 nanocuries/gram (nCi/g) of TRU radionuclides in the waste shall be interpreted as >100 nCi per gram of waste matrix. The weight of added external shielding and the waste containers (including any rigid liners) shall be subtracted prior to performing the nCi/g calculation. This is also applicable to wastes managed as TRU under the provisions of DOE Order 5820.2A (e.g., U-233 and Ra-226) (Reference 13).

Remote-Handled Waste

For purposes of TRU waste certification, the lower limit of >100 nCi/g of TRU radionuclides in the waste shall be interpreted as >100 nCi/g of waste matrix. The weight of added external shielding and the waste containers (including any rigid liners) shall be subtracted prior to performing the nCi/g calculation.

The maximum activity concentration for a RH-TRU waste package shall not exceed 23 curies/liter. The concentration may be averaged over the waste container.

3.3.6.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

Same as WIPP Operations And Safety Criteria, Section 3.3.6.1.

RH Cask Requirements

Same as WIPP Operations And Safety Criteria, Section 3.3.6.1.

3.3.6.3 RCRA REQUIREMENTS

None.

3.3.6.4 PERFORMANCE ASSESSMENT CRITERIA

Same as WIPP Operations And Safety Criteria, Section 3.3.6.1.

3.3.6.5 COMPLIANCE

Documented evidence shall exist to show that the specific activity of any TRU waste package is greater than 100 nCi/g of waste and that the activity of RH-TRU waste does not exceed 23 Ci/liter.

3.3.6.6 TECHNICAL JUSTIFICATION

The DOE Order 5820.2A "Radioactive Waste Management," Chapter II.3.a.(2), (Reference 13) states:

> "The lower concentration limit for transuranic waste (>100 nCi/g of waste) shall apply to the contents of any single waste package at the time of assay. The mass of the waste container including shielding shall not be used in calculating specific activity of the waste."

The upper limit of RH-TRU waste activity arises from the WIPP Final Environmental Impact Statement (Reference 34).

3.4 WASTE PACKAGE REQUIREMENTS/CRITERIA

3.4.1 WASTE PACKAGE WEIGHT

3.4.1.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled Waste

All CH-TRU waste packages or package assemblies shall weigh no more than 21,000 pounds.

Remote-Handled Waste

All RH-TRU waste packages shall weigh no more than 8,000 pounds.

3.4.1.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

The following weight limits shall apply for waste package assemblies transported in the TRUPACT-II package:

- **1,000 lbs per drum**
- **1,450 lbs per drum overpacked in a SWB**
- **4,000 lbs per SWB**
- **7,265 lbs per TRUPACT-II payload**
- **19,250 lbs per TRUPACT-II payload, including the weight of the TRUPACT-II.**

Recent enhancements in the TRUPACT-II design have resulted in an average payload weight of approximately 6,200 lbs. The total weight of the top seven-pack of drums or SWB including error shall be less than or equal to the total weight including error of the lower seven-pack of drums or SWB. The DOT limit of 80,000 lbs gross vehicle weight (GVW) must also be met.

RH Cask Requirements

To be determined.

3.4.1.3 RCRA REQUIREMENTS

None.

3.4.1.4 PERFORMANCE ASSESSMENT CRITERIA

None.

3.4.1.5 COMPLIANCE

For CH-TRU waste packages, documented evidence shall exist that the waste package has been weighed and the weight of the waste package or package assembly meets the requirements. The weight of the waste package cannot exceed the weight for which the waste package has been certified in accordance with 49 CFR § 173.463 (Reference 14).

For RH-TRU waste, the canister weight may be calculated based on the weight of the empty canister plus the weight of waste that will be placed in the canister. The weight of the canister cannot exceed the weight for which the waste package has been certified in accordance with 49 CFR § 173.463 (Reference 14).

3.4.1.6 TECHNICAL JUSTIFICATION

The CH-TRU waste handling system of the WIPP is limited by the capacity of the fork trucks that will transfer the CH-TRU waste materials on and off the waste hoist. These fork trucks have a rated lift capacity of 26,000 pounds. As this rated capacity must include an allowance for pallets and overpacks, estimated to be 5,000 pounds, a CH-TRU waste package may weigh a maximum of 21,000 pounds.

The WIPP has established a RH-TRU overpack gross weight limit of 10,000 pounds. It is estimated that a RH-TRU overpack may weigh 2,000 pounds, leaving a maximum gross weight of 8,000 pounds for the loaded RH canister.

The TRUPACT-II weight limits are based on the provisions of the TRUPACT-II SARP (Reference 9).

3.4.2 NUCLEAR CRITICALITY

3.4.2.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled Waste

The fissile or fissionable radionuclide content of CH-TRU waste packages shall be no greater than the following values, in Pu-239 fissile-gram equivalent:

- 200 g per 55-gallon (0.21 m^3) drum
- 500 g per DOT 6M container
- 5 g per ft^3 (0.028 m^3) in boxes, up to 350 g maximum.

The Pu-239 FGE shall be calculated using the methods detailed in Appendix 1.3.7 of the TRUPACT-II SARP (Reference 9).

Remote-Handled Waste

The fissile or fissionable radionuclide content of RH-TRU waste packages shall not exceed 600 g total (in Pu-239 FGE).

3.4.2.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

The fissile or fissionable radionuclide content of CH-TRU waste in the TRUPACT-II, including two times the measurement error, shall be less than 200 grams for a 55-gallon drum or less than 325 grams for a SWB. The sum of the fissile equivalents of all waste packages in the entire payload quantity including two times the error may not exceed 325 grams. See the calculational methods detailed in Appendix 1.3.7 of the TRUPACT-II SARP (Reference 9) for details.

RH Cask Requirements

The fissile or fissionable radionuclide content of RH-TRU waste in an RH cask including the measurement error shall be less than 325 grams of Pu-239 FGE. (This is a preliminary requirement based on meetings with the NRC and the SARP to be submitted for approval.)

3.4.2.3 RCRA REQUIREMENTS

None.

3.4.2.4 PERFORMANCE ASSESSMENT CRITERIA

Same as Transportation: Waste Package Requirements, Section 3.4.2.2.

3.4.2.5 COMPLIANCE

Assay data shall be presented to show that the fissile content complies with the limits of a waste package as described in Section 3.4.2.1. For CH-TRU waste packages not listed in this criterion, assay data shall be presented to show that the fissile content is less than 5 grams per cubic foot on a volumetric average with a total not to exceed 350 grams. For newly generated waste, documented procedures controlling the loading of contents into the waste package may be substituted for assay data.

3.4.2.6 TECHNICAL JUSTIFICATION

Criticality calculations were performed to substantiate the above limits. These calculations are documented in DOE/WIPP 88-014 "Criticality Safety Analysis for Contact-Handled Waste at the Waste Isolation Pilot Plant" (Reference 35) and DOE/WIPP 88-020, "Criticality Safety Analysis for Remote-Handled Waste at the Waste Isolation Pilot Plant" (Reference 36). The TRUPACT-II limits were imposed as part of the C of C (Reference 16) issued by the NRC.

3.4.3 PU-239 EQUIVALENT ACTIVITY

3.4.3.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled and Remote-Handled Waste

Waste packages shall not exceed 1000 Ci of Pu-239 equivalent activity (PE-Ci).

3.4.3.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

None.

RH Cask Requirements

None.

3.4.3.3 RCRA REQUIREMENTS

None.

3.4.3.4 PERFORMANCE ASSESSMENT CRITERIA

None.

3.4.3.5 COMPLIANCE

Documented analyses shall be available to show that each package meets the limit.

3.4.3.6 TECHNICAL JUSTIFICATION

Appendix A details the calculational methods to obtain PE-Ci. DOE/WIPP 87-014, "The Assessment of Allowable Transuranic Activity Levels for WIPP Wastes" (Reference 37) reports as the maximum Pu-239 equivalent activity for individual waste packages: 9100 PE-Ci per CH-TRU waste package; and a value greater than 1×10^6 PE-Ci per RH-TRU waste canister. These values ensure that the radiological performance criteria applicable to the WIPP are not exceeded.

An operating limit of 1000 PE-Ci for each waste package is established. Other criteria/requirements of the WIPP Operations and Safety Criteria (i.e., criticality limits) and TRUPACT-II (i.e., criticality and wattage limits) generally restrict the activity in the waste containers to significantly less than 1000 PE-Ci.

3.4.4 SURFACE DOSE RATE

3.4.4.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled Waste

Waste packages shall have a maximum surface dose rate at any point no greater than 200 milliroentgen equivalent man per hour (mrem/hr). Neutron contributions of greater than 20 mrem/hr to the total waste package dose rate shall be reported separately in the data package.

Remote-Handled Waste

All RH-TRU waste packages shall have a surface dose rate at any point no greater than 1000 rem/hr. Neutron contributions are limited to 270 mrem/hr. Neutron contributions of greater than 20 mrem/hr to the total waste package dose rate shall be reported in the data package. At least 95% of the RH canisters must have dose rates of $\leq$ 100 rem/hr, and no more than 5% of the RH canisters are allowed to have dose rates of > 100 rem/hr but $\leq$ 1000 rem/hr. Prior approval by the WIPP is required before RH canisters having dose rates > 100 rem/hr but $\leq$1000 rem/hr may be shipped to the WIPP.

3.4.4.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

The external dose rates on the loaded TRUPACT-II placed on the trailer are limited to 200 mrem/hr at the surface of the TRUPACT-II and 10 mrem/hr at two meters. Dose rates on the TRUPACT-II must comply with 10 CFR 71.47 (Reference 15). Drums or SWBs shall not exceed the 200 mrem/hr surface reading or 10 mrem/hr at two meters. Shielded waste containers are allowed for As Low As Reasonably Achievable (ALARA) purposes only and must comply with Section 12.0 of Appendix 1.3.7 of the TRUPACT-II SARP (Reference 9).

RH Cask Requirements

The external dose rate on the loaded RH cask is limited to 200 mrem/hr at the surface of the cask and 10 mrem/hr at two meters from the cask. Dose rates on the cask must comply with 10 CFR 71.47 (Reference 15).

3.4.4.3 RCRA REQUIREMENTS

None.

3.4.4.4 PERFORMANCE ASSESSMENT CRITERIA

Same as WIPP Operations And Safety Criteria, Section 3.4.4.1.

3.4.4.5 COMPLIANCE

Documented procedures are used for the measurement of dose rates on each type of waste package. The instrumentation used must be properly calibrated using sources traceable to the National Institute of Science and Technology (NIST). The results of these measurements will be documented for each waste package.

3.4.4.6 TECHNICAL JUSTIFICATION

The CH-TRU waste radiation level limits were selected based on existing DOT requirements. The maximum allowable surface dose rate for a waste package is 200 mrem/hr. The average anticipated dose rate for a waste package to be emplaced in the WIPP is 6 mrem/hr, which would maintain the occupational exposures at the WIPP at less than 1 rem/yr (Reference 38). A shielded storage area is available in the waste handling building for the temporary storage of CH-TRU waste packages with dose rates between 100 and 200 mrem/hr. All RH-TRU waste handling equipment was designed based on a maximum radiation level of 1000 rem/hr in contact with the canister. The 270 mrem/hr neutron limit for the RH canister is based on limiting the external neutron contribution when the canister is in the WIPP transfer cask.

3.4.5 REMOVABLE SURFACE CONTAMINATION

3.4.5.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled and Remote-Handled Waste

Removable surface contamination on waste packages or package assemblies to be emplaced in WIPP shall not be greater than 50 picocuries per 100 cm^2 for alpha-emitting radionuclides and 450 picocuries per 100 cm^2 for beta-gamma-emitting radionuclides. Fixation of surface contamination to meet the above criterion is not permitted.

3.4.5.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

None.

RH Cask Requirements

None.

3.4.5.3 RCRA REQUIREMENTS

None.

3.4.5.4 PERFORMANCE ASSESSMENT CRITERIA

Same as WIPP Operations And Safety Criteria, Section 3.4.5.1.

3.4.5.5 COMPLIANCE

The generator must measure the degree of removable surface contamination for each waste package or package assembly prior to its shipment. The sampling methods are described in 49 CFR 173.443 (Reference 14). The results of these surveys must be documented.

3.4.5.6 TECHNICAL JUSTIFICATION

Experiences in the Naval nuclear program have shown that facilities can be maintained "clean" if removable alpha-contamination levels are kept at or below 50 picocuries/100 cm^2 and removable beta-gamma contamination at or below 450 picocuries/100 cm^2 (50 percent of the DOT levels). Experience has shown that these levels are readily achievable.

The removable surface contamination levels specified in 3.4.5.1 are approximately one-half the levels for transportation packaging (e.g., TRUPACT-II) delineated in 49 CFR 173.443 (Reference 14) for radioactive materials intended for over-the-road transport, and considered by the DOT to be adequate for transportation. For facilities such as the WIPP, the levels in 49 CFR 173.443 (Reference 14) could result in a buildup of unacceptable contamination within the facility over a period of time.

3.4.6 THERMAL POWER

3.4.6.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled Waste

Individual CH-TRU waste packages in which the average thermal power density exceeds 0.1 watt/ft^3 (3.5 watts/m^3) shall have the thermal power recorded in the data package.

Remote-Handled Waste

The thermal power generated by waste materials in any RH-TRU waste package shall not exceed 300 watts. The thermal power shall be recorded in the data package.

3.4.6.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

There are two thermal limits for decay heat: 1) the total decay heat from the radioactive decay of the radioisotopes within an individual waste package and 2) the total decay heat from all waste packages in a TRUPACT-II. The detailed limits are contained in the TRUPACT-II SARP (Reference 9). The decay heat limits for waste packages in each shipping category are presented in the TRUPACT-II SARP Table 1.2.3.3-1 for the Analytical Categories and Table 1.2.3.3-2 for the Test Categories. The total decay heat limits per TRUPACT-II for each shipping category are listed in Table 1.2.3.3-3. In determining whether or not a waste package or a group of waste packages meets the limits, the error must be added to the measured value. The design limit for TRUPACT-II is 40 watts.

RH Cask Requirements

To be determined.

3.4.6.3 RCRA REQUIREMENTS

None.

3.4.6.4 PERFORMANCE ASSESSMENT CRITERIA

For the CH-TRU in the Test Phase the same limits apply as in the Transportation Waste Package Requirements, Section 3.4.6.2.

3.4.6.5 COMPLIANCE

Documented evidence shall be presented that each waste package meets the indicated limits based on the radionuclide distribution and quantity of radioactive material present.

3.4.6.6 TECHNICAL JUSTIFICATION

The design basis for the WIPP is based on a thermal loading of 10 kW per acre. The emplacement density of CH-TRU waste in the WIPP is approximately 72,000 cubic feet of waste per acre. Using the 10 kW limit, this would allow an average heat generation of 0.14 watt per cubic foot or 1.0 watt per 55-gallon drum.

The present emplacement plan for RH-TRU waste calls for an emplacement density of 70 canisters per acre in conjunction with a room filled with the CH-TRU waste. The calculated maximum internal heat-generation rate of less than 60 watts per canister would contribute only 4.2 kW per acre. Individual canisters could generate up to 300 watts per canister without exceeding the thermal limit for the WIPP as the majority of the canisters projected for shipment to the WIPP will be less than one watt each.

The TRUPACT-II SARP limits are based on the bounding radiolytic gas generation capabilities of the waste and ensuring that any hydrogen generated in the innermost waste bag will not exceed five volume percent over a 60-day transport time.

3.4.7 GAS GENERATION

3.4.7.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled and Remote-Handled Waste

Waste containers with waste that could potentially generate gases shall be vented.

3.4.7.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

The gas generation and release characteristics of the waste containers shall be controlled by complying with the following requirements:

- **All waste containers, including any overpacks, shall be vented with filters that meet the specifications described in the TRUPACT-II SARP (Reference 9). The minimum number of filters shall be one per drum, two per overpacked experimental bin in a SWB, and two per SWB.**

- **Any rigid drum liners used in the waste containers shall either be filtered or punctured, as specified in the TRUPACT-II SARP (Reference 9).**

- **Any confinement layers (as defined in the TRUPACT-II SARP) used in the waste containers shall be closed only by a twist and tape or fold and tape closure. No sealed containers greater than one gallon in size shall be present as part of the waste.**

- **The maximum number of confinement layers in the waste containers shall be known, and shall conform to the shipping category description provided in the TRUPACT-II SARP (Reference 9) and the TRUPACT-II Content Codes document (Reference 39).**

- **Any chemical/material existing in the waste in excess of one weight percent must be evaluated to ensure that no adverse reactions could take place during transportation and that the chemical/material or any products of reactions are compatible with the materials of construction of the TRUPACT-II.**

- **The combined total quantity of all trace chemicals/materials (chemical/materials that occur in the waste in quantities less than one weight percent) in any waste package is restricted to less than five weight percent.**

- **Chemicals and materials present in concentrations greater than one weight percent, shall conform to the allowable chemicals in each waste material type, as defined in the TRUPACT-II SARP (Reference 9).**

- **The total concentration of potentially flammable VOCs shall be limited to 500 ppm in the headspace of a waste package. (This value should include error measurement, as defined in the QAPP) (Reference 8).**

RH Cask Requirements

To be determined.

3.4.7.3 RCRA REQUIREMENTS

The flammability requirements at the NMD (Reference 23) are:

- **Verify that any waste package to be emplaced in the WIPP during the experimental period does not exceed 50 percent of the lower explosive limit (LEL) in any layer of confinement for hydrogen (H_2) and methane (CH_4), when potentially flammable VOCs as a class are <500 ppm. A layer of confinement is defined as a bagging layer that has waste inside that layer. The methodology for demonstrating compliance with this flammability requirement is presented in the QAPP (Reference 8).**

- **If the potentially flammable VOCs occur in the headspace in concentrations greater than 500 ppm as a class, then a flame test (Reference 8) must be performed prior to acceptance of that waste package for emplacement underground in the WIPP for experimental purposes. (The 500 ppm potentially flammable VOC limit in the TRUPACT-II SARP (Reference 9) is generally more restrictive than this requirement. If flammable VOCs exceed 500 ppm in the headspace of a waste package, that waste package cannot be shipped under the current C of C (Reference 16).)**

- **If the summed value for potentially flammable VOCs exceeds 500 ppm, a theoretical LEL shall be calculated using the concentrations of the flammable VOCs plus hydrogen and methane, as outlined in the QAPP (Reference 8).**

3.4.7.4 PERFORMANCE ASSESSMENT CRITERIA

The PA waste characterization criteria, from the bin-scale (References 24 and 25) and alcove test plans (Reference 26), are summarized in the "Waste Characterization Program Plan for WIPP Experimental Waste," DOE/WIPP 89-025 (Reference 12). For the waste generated or retrieved from storage during but not part of the test phase, the following criteria must be satisfied for a statistical population of packages:

- **RTR or equivalent examination**

- **Radionuclide assay for total alpha activity**

- **Headspace analysis for inorganic and organic gases**

- **Visual examination of the waste**

- **Analysis of sludges for pH and major cations and anions.**

The relationship between the WCPP for the WIPP Experimental Waste (Reference 12), the WIPP QAPP (Reference 8), the SNL Test Plan Requirements (References 24, 25, and 26), and the generator and/or storage site procedures and QAPJPs is shown in Figure 3-1.

3.4.7.5 COMPLIANCE

The placement of filter vents can be verified by physical inspection. The data criteria will be met as part of the WIPP Waste Information System (WWIS) data transmittal.

3.4.7.6 TECHNICAL JUSTIFICATION

The various limits pertaining to the gas generation potential of the waste are to ensure that the waste does not present a hazard for transportation, handling, or disposal and that the waste meets the criteria of the WCPP (Reference 12) and the NMD (Reference 23).

3.4.8 LABELING

3.4.8.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled Waste

In addition to DOT labeling requirements, each waste container shall be uniquely identified by means of a label permanently attached in a conspicuous location. The package identification number shall be in medium to low density Code 39 barcode symbology per MIL-STD-1189B (Reference 40) in characters at least 1 inch high, and alphanumeric characters at least 1/2 inch high.

The identification marking must be reasonably expected to remain legible and affixed to the container for a period of 10 years under anticipated conditions of interim storage before shipment to the WIPP and emplacement underground.

Remote-Handled Waste

Each RH Canister shall be uniquely identified by means of an identification number permanently attached to the container in a conspicuous location using characters at least 2 inches high.

The identification marking must be reasonably expected to remain legible and affixed to the canister for a period of 10 years under anticipated conditions of interim storage before shipment to the WIPP and emplacement underground.

3.4.8.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

In addition to the WIPP Operations and Safety Criteria, each waste package shall be marked with the shipping category after verification of all payload parameters.

RH Cask Requirements

To be determined.

3.4.8.3 RCRA REQUIREMENTS

Per 40 CFR 262.30 through 262.33 (Reference 18), a generator must properly package, label, mark, and placard hazardous waste before transportation offsite in accordance with applicable DOT regulations 49 CFR 172, 178, and 179, (Reference 14).

3.4.8.4 PERFORMANCE ASSESSMENT CRITERIA

Refer to the WCPP (Reference 12) and the QAPP (Reference 8) for details of the specific labeling requirements for waste packages and sample accountability.

3.4.8.5 COMPLIANCE

In addition to DOT labeling requirements, each waste package shall be labeled with a unique package identification number consisting of a generating site identification and package identification. The bar code identification labels will be placed at three locations about 120 degrees apart within five inches of the bottom, and one label on the top surface of each drum. Labels are required on all sides and the top of rectangular containers.

3.4.8.6 TECHNICAL JUSTIFICATION

The use of an unique identification number for each waste package allows the tracking of the container for waste certification and transportation parameters. This number also ties together the waste package and the associated data package and allows verification by the WIPP that the received package is the container listed on the manifest. The labeling of the shipping category on each CH-TRU waste container is a requirement of the TRUPACT-II C of C (Reference 16).

3.5 DATA PACKAGE REQUIREMENTS/CRITERIA

3.5.1 DATA PACKAGE/CERTIFICATION

3.5.1.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled and Remote-Handled Waste

A data package with certification attesting to the fact that the waste package meets the requirements of these criteria shall be transmitted to the WIPP operator in advance of shipment. This data package/certification shall be based upon a QA program subject to audit and verification and shall provide information on the items specified below:

- **Package identification number**
- **Package assembly identification number (if applicable)**
- **Date of waste package certification**
- **WAC exception number (if applicable)**
- **Waste generation site**
- **Date of package closure**
- **Maximum surface dose rate in mrem/hr and specific neutron dose rate if greater than 20 mrem/hr**
- **Weight (in kg)**
- **Container type**
- **Physical description of waste form (content code)**
- **Assay information, including PE-Ci, alpha Ci, and Pu-239 FGE content**
- **Radionuclide information including radionuclide symbol, quantity, and measure (in grams or Curies)**
- **Radioactive mixed waste (identity and quantity of listed wastes and those that exhibit the characteristics of a hazardous waste)**
- **Weight and volume percent of organic materials content**
- **Measured or calculated thermal power (if over 0.1 watt/ft^3)**
- **Shipment number**

- Date of shipment
- Vehicle type
- TRUPACT-II number(s) (CH-TRU waste), or cask number (RH-TRU waste)
- Other information considered significant by the generator
- Name of certifying official who approved the waste package
- Name of person who certifies that the shipment meets the TRUPACT-II TRAMPAC

A hard copy of the signed and dated Certification Statement, certifying that the waste content and packaging are in accordance with the WIPP WAC and that the waste is unclassified, shall be maintained on file at each site for WACCC audits.

The specific data format for the transmittal of this information is contained in Appendix B of this document.

3.5.1.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements

The documentation required for the certification of an individual waste package or a group of waste packages for an individual TRUPACT-II is given in Section 13.0 of Appendix 1.3.7 of the TRUPACT-II SARP (Reference 9). Information from this section is included in this document as Appendix C. The format of these tables is not mandatory, however, all listed parameters must be included in any site documentation. This documentation may be computer generated based on the site's waste data base.

RH Cask Requirements

To be determined.

3.5.1.3 RCRA REQUIREMENTS

A generator must prepare a specific hazardous waste manifest in accordance with the EPA requirements of 40 CFR § 262.20 through 262.23 (Reference 18). A generator must also sign the certification on the manifest that indicates that the generator has a program in place to reduce the volume and toxicity of the waste generated. Identification numbers that link each RCRA-regulated waste container and the waste data package must also accompany the manifest. The identification numbers must be attached to the waste profile documentation. The Land Disposal Restriction (LDR) Certification required by the 40 CFR 268 (Reference 18) must also accompany the manifest and data package.

3.5.1.4 PERFORMANCE ASSESSMENT CRITERIA

Sites must provide a data package of the information required by the WCPP (Reference 12).

3.5.1.5 COMPLIANCE

The generator shall have operating procedures for determining data required in this criterion. The data package in the format specified in Appendix C shall be transmitted to the WIPP prior to shipment of the waste. Copies of the signed certification statement for each waste package including the identification number shall be maintained by the shipping site. The associated data package must be maintained along with the certification statement or in the site's data base.

The data requirements of Section 13.0 of the TRUPACT-II SARP (Reference 9) and the RCRA manifest shall be maintained by the shipping site for audit by the WACCC.

3.5.1.6 TECHNICAL JUSTIFICATION

The QAPP (Reference 8) details the data reporting requirements for data in support of the Test Phase activities. The WIPP Operations and Safety data package/certification data will be incorporated into the WWIS and used by the WIPP for inventory purposes and ensuring compliance with various requirements. Consequently, the data reported shall be the nominal values, not including

any error estimations. The error estimations will be maintained in the TRUPACT-II data packages. The incorporation of the positive errors into the data as is required with the TRUPACT-II payload criteria would produce an overestimate of the inventory and bias any subsequent analysis. Consequently, there are three data sets: one for the WIPP Operations and Safety Criteria and one for shipment (TRUPACT-II/RH-Cask), and one for RCRA compliance. The sites may maintain these data in a single data base but the information must be detailed enough to allow separation into the WAC and shipping categories.

3.6 OTHER REQUIREMENTS/CRITERIA

3.6.1 ADDITIONAL REQUIREMENTS

3.6.1.1 WIPP OPERATIONS AND SAFETY CRITERIA

Contact-Handled Waste

None.

Remote-Handled Waste

None.

3.6.1.2 TRANSPORTATION: WASTE PACKAGE REQUIREMENTS

TRUPACT-II Requirements –

Other transportation waste package specific criteria include the following:

- **All of the waste packages in a single TRUPACT-II shall belong to the same shipping category, as defined in the TRUPACT-II SARP (Reference 9).**
- **Each of the waste packages to be shipped shall belong to one of the content codes defined in the TRUPACT-II Content Codes (TRUCON) document (Reference 39).**
- **Retrievably stored waste that has been stored in an unvented condition shall be sampled and/or aspirated as per the requirements specified in the TRUPACT-II SARP (Reference 9).**
- **The payload control procedures outlined in Section 7.4.3 of the TRUPACT-II SARP (Reference 9) shall be followed for the shipment of CH-TRU waste in the TRUPACT-II package.**

RH Cask Requirements

To be determined.

3.6.1.3 RCRA REQUIREMENTS

The NMED has the authority to promulgate additional requirements for the management of TRU mixed waste and to issue site-specific permit conditions during the RCRA permitting process. The NMED has not yet stipulated additional requirements for the mixed waste program. Future requirements, as applicable to the WAC, will be incorporated into this document or other applicable documents as they become known.

3.6.1.4 PERFORMANCE ASSESSMENT CRITERIA

None

3.6.1.5 COMPLIANCE

Records shall be available to show compliance with the requirements.

3.6.1.6 TECHNICAL JUSTIFICATION

Requirements are instituted by regulatory bodies external to the WIPP.

4.0 QUALITY ASSURANCE REQUIREMENTS

Quality assurance is an integral part of certification program activities and shall be implemented by all users of these WAC. This section defines planned and systematic QA activities which provide confidence that each site's TRU Waste Certification Program will perform satisfactorily. Each waste generator and/or storage site shall be responsible for developing and documenting a QA plan (or plans) that will provide the specifics of implementing the guidelines provided in this section. Each waste generator and storage site shall assure that their QA Program (QAP) will result in only fully certified waste being shipped to WIPP. Until certification and QA plans are reviewed and approved by the DOE/WPIO and WACCC, and the DOE/WPSO, TRU wastes cannot be formally certified, characterized, or transported to and emplaced in the WIPP. Documentation requirements for the sites to complete the certification process are summarized in Table 2-1. The process for obtaining certification, and the responsibilities of the various organizations are summarized in Figure 2-1.

Section 4.1 presents the requirements for developing and implementing a Quality Assurance Program for certification of TRU waste to meet the WIPP Operations and Safety Criteria (Reference 3). QA requirements for the site specific TRAMPAC are referenced in Section 4.2, and QA requirements for waste characterization, as necessary for compliance with the WIPP RCRA and NMD requirements and PA criteria, are referenced in Section 4.3. QA requirements for full certification of TRU wastes are identified in the following sections.

4.1 WIPP OPERATIONS AND SAFETY CRITERIA QUALITY ASSURANCE REQUIREMENTS

This section presents the QA elements which shall be included in the QAP established by sites for the certification of TRU waste to the WIPP Operations and Safety Criteria. The application of QA to waste certification programs is required by the DOE Orders 5700.6C (Reference 41) and 5820.2A, "Radioactive Waste Management" (Reference 13) as implemented by the DOE/AL Order AL 5700.6B (Reference 42) and any additional DOE/AL Orders or WIPP Project Management Directives supplementing DOE Order 5700.6C.

Quality Assurance Programs developed using existing standards or guides may require modification to address the requirements of DOE 5700.6C (Reference 41). Programs developed and properly implemented using ASME/NQA-1 (Reference 43), will meet the majority of the requirements of this Order. For programs which are not based on ASME/NQA-1 (Reference 43), other standards and guidance may be used to supplement this document. Organizations should use each standard or guidance document in combination with DOE 5700.6C to ensure their programs address the applicable requirements. The format and number of criteria contained in an organization's QAP are important only if they affect the organization's performance. In any case, the QA program submitted for approval shall meet the minimum requirements of DOE Order 5700.6C.

4.2 TRANSPORTATION PACKAGING QUALITY ASSURANCE REQUIREMENTS

The QA requirements for transportation packaging efforts are addressed in the QA section of the SARPs. The site-specific QA Plan for transportation packaging activities must meet the requirements of 10 CFR 71 Subpart H (Reference 15), 49 CFR Part 173 (Reference 14), DOE/WIPP 89-012 (Reference 11), and the specific transportation packaging C of C. The site-specific QA Plan and the site-specific TRAMPAC, which may be separate or combined into one document, must be submitted to the DOE/WPIO and WACCC, and the DOE/WPSO for approval. The DOE/WPIO and WACCC, with the participation of the DOE/WPSO, will conduct audits and/or surveillances to assure that sites are in compliance with their approved site-specific QA Plan. Observers from NMED and EEG provide independent oversight during these audits/surveillances.

4.3 WASTE CHARACTERIZATION QUALITY ASSURANCE REQUIREMENTS

The QA requirements for the waste characterization efforts at the generator and storage sites are contained in the QAPP (Reference 8). Waste characterization efforts here include both those associated with the WIPP RCRA (i.e., NMD and NMED) requirements and the WIPP PA criteria. The sites are responsible for identifying QA and quality control activities in the site-specific QAPjP submitted to the DOE/WPIO and WACCC, and the DOE/WPSO for approval. These organizations

will conduct audits and/or surveillances to assure that sites are in compliance with their approved site-specific QAPjP. Observers from NMED and EEG provide independent oversight during these audits/surveillances.

5.0 REFERENCES

1. U.S. Department of Energy. "Waste Acceptance Criteria for the Waste Isolation Pilot Plant," WIPP/DOE-069 Revision 3, January 1989.

2. U.S. Department of Energy. "TRU Waste Certification Compliance Requirements for Acceptance of Newly Generated Contact-Handled Wastes to be Shipped to the Waste Isolation Pilot Plant," WIPP-DOE-114 Revision 2, January 1989.

3. U.S. Department of Energy. "Quality Assurance Requirements for Certification of TRU Waste For Shipment to the Waste Isolation Pilot Plant," WIPP-DOE-120 Revision 2, August 1988.

4. U.S. Department of Energy. "TRU Waste Certification Compliance Requirements for Acceptance of Contact-Handled Wastes Retrieved from Storage to be Shipped to the Waste Isolation Pilot Plant," WIPP-DOE-137 Revision 2, January 1989.

5. U.S. Department of Energy. "Data Package Format for Certified TRU Waste for the Waste Isolation Pilot Plant," WIPP-DOE-157 Revision 2, January 1989.

6. U.S. Department of Energy. "TRU Waste Certification Compliance Requirements for Remote-Handled Wastes for Shipment to the Waste Isolation Pilot Plant," WIPP-DOE-158 Revision 1, January 1989.

7. U.S. Department of Energy. "Quality Assurance Guidance for TRUPACT-II Payload Control," DOE/WIPP 89-007, October 1989.

8. U.S. Department of Energy. "Quality Assurance Program Plan for the Waste Isolation Pilot Plant Experimental-Waste Characterization Program," DOE/EM/48063-1, Revision 1, July 1991.

9. NuPac. "Safety Analysis Report for the TRUPACT-II Shipping Package (SARP)," Docket No. 71-9218, Revision 9, 1990 or Current Revision.

10. Westinghouse Waste Isolation Division. "Final Safety Analysis Report. Waste Isolation Pilot Plant, Carlsbad, New Mexico," WP 02-9, Revision 0, May 1990.

11. U.S. Department of Energy. "Quality Assurance (QA) Plan for the Transportation and Receipt of Transuranic (TRU) Waste," DOE/WIPP 89-012, February 1990.

12. U.S. Department of Energy. "Waste Characterization Program Plan for Waste Isolation Pilot Plant Experimental Waste," DOE/WIPP 89-025, Revision 1, July 1991.

13. U.S. Department of Energy. "Radioactive Waste Management," DOE Order 5820.2A, September 26, 1988 or Current Revision.

14. U.S. Government Printing Office. "Transportation, Title 49, Code of Federal Regulations, Parts 172, 173, 178, and 179," January 1990.

15. U.S. Government Printing Office. "Energy, Title 10, Code of Federal Regulations, Part 71, Packaging and Transportation of Radioactive Material," January 1991.

16. U.S. Department of Energy. "Nuclear Packaging, Inc. Application," Certificate of Compliance Number 9218, Revision 3, August 1, 1991 or Current Revision.

17. U.S. Department of Energy. "Waste Acceptance Criteria Certification Committee Management Program," DOE/WIPP 90-004, September 1990 or Current Revision.

18. U.S. Government Printing Office. "Protection of Environment, Title 40, Code of Federal Regulations, Parts 261, 262, 264, 265, and 268," July 1990.

19. U.S. Department of Energy/Westinghouse Electric Corporation. "Waste Isolation Pilot Plant RCRA Part A Permit Application," Submitted January 22, 1991.

20. U.S. Department of Energy/Westinghouse Electric Corporation. "Resource Conservation and Recovery Act Part B Permit Application," DOE/WIPP 91-005, February 1991 or Current Revision.

21. U.S. Congress. Atomic Energy Act of 1954, Public Law 703, as amended.

22. U.S. Department of Energy. "Waste Isolation Pilot Plant: No-Migration Variance Petition," WIPP-DOE 89-003, Revision 1, 1990.

23. U.S. Environmental Protection Agency. "No-Migration Determination," Federal Register, Vol. 55, No. 220, November 1990, 47700-47721.

24. Sandia National Laboratory. "Test Plan: WIPP Bin-Scale CH-TRU Waste Tests," SAND90-1974, August 1990.

25. Sandia National Laboratory. "Test Plan Addendum 1: Waste Isolation Pilot Plant Bin-Scale CH-TRU Waste Tests," SAND90-2082, December 1990.

26. Sandia National Laboratory. "Test Plan: WIPP In Situ Alcove CH-TRU Waste Tests," Sandia National Laboratories, January 1990.

27. U.S. Department of Energy. "WIPP (Waste Isolation Pilot Plant) Test Phase Plan: Performance Assessment, Revision," DOE/WIPP-89-011-Rev. 0. April 1990. Available from the National Technical Information Service, Springfield, VA 22161.

28. Sandia National Laboratory. SAND90-2481, "Rationale for Revised WIPP Bin-Scale Gas Generation Test with CH TRU Wastes," Sandia National Laboratories, February 1991. Available from Sandia National Laboratory, Albuquerque, New Mexico 87185.

29. U.S. Environmental Protection Agency. "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans," QAMS-005/80. December 29, 1980 or Current Revision. Available from the Office of Monitoring Systems and Quality Assurance, U.S. Environmental Protection Agency, Washington, D.C. 20460.

30. U.S. Department of Energy. "DOE Evaluation Document for DOT 7A Type A Packaging," DOE/DP/00058-H1; MLM 3245, March 1987.

31. Rockwell Hanford Company. "User's Manual for Remote-Handled Transuranic Waste Containers", RHO-RE-MA-7, September 1984.

32. Rockwell International. "Plutonium in Oxide to be Shipped to the Savannah River Plant," FET898-74-116, Rocky Flats Plant, March 1974.

33. U.S. Department of Energy. "Hazardous and Radioactive Mixed Waste Program," DOE Order 5400.3, February 22, 1989 or Current Revision.

34. U.S. Department of Energy. "Final Environmental Impact Statement. Waste Isolation Pilot Plant," DOE/EIS-0026, October 1980.

35. U.S. Department of Energy. "Criticality Safety Analysis for Contact-Handled Waste at the Waste Isolation Pilot Plant," DOE/WIPP 88-014, June 1988.

36. U.S. Department of Energy. "Criticality Safety Analysis for Remote-Handled Waste at the Waste Isolation Pilot Plant," DOE/WIPP 88-020, July 1988.

37. U.S. Department of Energy. "Assessment of Allowable Transuranic Activity Levels for WIPP Wastes," DOE/WIPP 87-014, December 1987.

38. U.S. Department of Energy. "Preliminary Radiation Dose Assessment to Waste Isolation Pilot Plant Waste Handling Personnel," WISD-TME-009, February 1985.

39. U.S. Department of Energy. "TRUPACT-II Content Codes (TRUCON)," DOE/WIPP 89-004, Revision 5, April 1991 or Current Revision.

40. U.S. Department of Defense. "Standard Department of Defense Bar Code Symbology," MIL-STD-1189B, August 10, 1989.

41. U.S. Department of Energy. "Quality Assurance," DOE Order 5700.6C or Current Revision.

42. U.S. Department of Energy. "Quality Assurance," DOE Order AL 5700.6B or Current Revision.

43. American Society of Mechanical Engineers (ASME). "Quality Assurance Programs Requirements for Nuclear Facilities," ASME NQA-1, 1989.

44. U.S. Department of Energy. "Record Disposition," DOE Order 1324.2A or Current Revision.

45. U.S. Department of Energy. "General Design Criteria," DOE Order 6430.1A or Current Revision.

6.0 APPENDICES

APPENDIX A

CALCULATION OF PU-239 EQUIVALENT ACTIVITY

A.0 CALCULATION OF PU-239 EQUIVALENT ACTIVITY

Pu-239 Equivalent Activity is determined using radionuclide-specific weighting factors. To obtain this correlation, the 50-year effective whole body dose commitment or dose conversion factor (DCF) for a unit intake of each radionuclide will be used. These DCFs have been determined by the methodology described in International Commission on Radiological Protection (ICRP) Publications 26 and 30 (References A1 and A2) and are consistent with current DOE guidance (Reference A3). The Pu-239 equivalent activity (AM) can be characterized by:

$$AM = \sum_{i=1}^{K} \frac{Ai}{WF_i}$$

where k is the number of transuranic (TRU) radionuclides, A_i is the activity of radionuclide i, and WF_i is the PE-Ci weighting factor for radionuclide i.

WF_i is further defined as the ratio:

$$WF_i = \frac{E_o}{E_i}$$

Where E_o (rem/μCi) is the 50-year effective whole body dose commitment due to the inhalation of Pu-239 particulates with a 1.0 μm Activity Median Aerodynamic Diameter (AMAD) and a weekly (W) pulmonary clearance class, and E_i (rem/μCi) is the 50-year effective whole body dose commitment due to the inhalation of radionuclide i particulates with a 1.0 μm AMAD and the pulmonary clearance class resulting in the highest 50-year effective whole body dose commitment.

The value of E_o and E_i may be obtained from WIPP-DOE-176 (Reference A4). Weighting factors calculated in this manner are presented below for selected radionuclides of interest.

Radionuclide	Pulmonary Clearance Class*	Weighting Factor	1000 Ci Pu-239 Equivalent (CiE)
U-233	Y	4.0	4000
Np-237	W	1.0	1000
Pu-236	W	3.1	3100
Pu-238	W	1.1	1100
Pu-239	W	1.0	1000
Pu-240	W	1.0	1000
Pu-241	W	52.0	52000
Pu-242	W	1.1	1100
Am-241	W	1.0	1000
Am-243	W	1.0	1000
Cm-242	W	29.0	29000
Cm-244	W	1.9	1900
Cf-252	Y	3.5	3500

*(D) Daily (W) Weekly (Y) Yearly

To determine if a waste package with several radionuclides does not exceed 1000 Ci Pu-239 equivalent, AM from the previous page must be less than or equal to 1000.

No estimate of non-TRU radionuclides, except those within the scope of the above description, will be included. However, generators will be asked to characterize any waste stream which contains an unusually high Sr-90 content relative to normal fission product isotopic distribution.

APPENDIX A REFERENCES

A1. Recommendations of the International Commission on Radiological Protection, ICRP Publication 26, January 1977.

A2. Limits for Intakes of Radionuclides by Workers, ICRP Publication 30, July 1978.

A3. DOE Memorandum, April 25, 1985, R. W. Earl (Acting Director, Real Property and Facilities Management Division, Office of Project and Facilities Management) to C. N. Mitchell (Director, Office of Project and Facilities Management) Radiological Siting Requirements DOE Order 5430.1, General Design Criteria, dated December 12, 1983.

A4. WIPP-DOE-176, "Estimates of Internal Dose Equivalent from Inhalation and Ingestion of Selected Radionuclides," Donald E. Dunning.

APPENDIX B

WIPP OPERATIONS AND SAFETY DATA PACKAGE REQUIREMENTS

B.0 DATA PACKAGE REQUIREMENTS

This section specifies the arrangement of data which is required to be reported to the Waste Isolation Pilot Plant (WIPP) for transuranic (TRU) waste to be received. These instructions have been prepared as a reference guide for those personnel responsible for the transmission of the data package to the WIPP.

Prior to shipment, the shipper's computer system must retrieve the required information for all the packages in that shipment and write the information to an International Business Machines (IBM) or IBM-compatible personal computer in the record and file layout format, as detailed in Table B-1. The data package will then be transmitted in ASCII format over the specified communications system to the WIPP Waste Information System (WWIS) using RLINK, which will be furnished by WIPP. Therefore, these instructions are primarily for use by data processing personnel to aid them in programming the system to provide the transmittal information in the data package format.

The WWIS was developed using NOMAD2 and resides on a mainframe computer operated by EG&G Idaho, Inc., at the Idaho National Engineering Laboratory (INEL).

B.1 TRANSMISSION OF DATA TO THE WWIS

The Data Administrator at WIPP will be the liaison between the shippers and EG&G Idaho, who operate the host computer where the WWIS resides. Shippers will contact the Data Administrator to obtain a password and identification (ID) code to transmit data to the WWIS.

In the event a shipper encounters problems with data transmittal, deletion, or editing in the WWIS, the shipper should contact the Data Administrator.

TABLE B-1 RECORD AND FILE LAYOUT

Record	Begins in Column	Field	Field Format
1	1	Record Type	S
	2	Shipment Number	A8
	9	Shipment Date	A6 'YYMMDD'
	15	Vehicle Type	A1
	16	Waste Type	A2
	18	Shipment Certification Date	A6 'YYMMDD'
	24	TRUPACT/Cask Number	A3
	27	TRUPACT/Cask Number	A3
	30	TRUPACT/Cask Number	A3
	33	Package Assembly Number	A8
	41	Package Assembly Number	A8
	49	Package Assembly Number	A8
	57	Package Assembly Number	A8
	65	Package Assembly Number	A8
	73	Package Assembly Number	A8
	81	TRUPACT-II APC Certifier	A25
2	1	Record Type	P
	2	Package ID Number	A13
	15	Container Code	A3
	18	Shipment Number	A8
	26	Closure Date	A6 'YYMMDD'
	32	TRUPACT/Cask Number	A3
	35	Waste Type	A2
	37	Package Assembly Number	A8
	45	Package Certification Date	A6 'YYMMDD'
	51	Internal RH-TRU Container	9
	60	Weight	A7 (9.9E+99)
	67	Organic Materials Weight	A7 (9.9E+99)
	74	Organic Materials Volume %	999
	77	Surface Dose Rate	A7 (9.9E+99)
	84	Neutron Contribution	A7 (9.9E+99)
	91	Thermal Power	A7 (9.9E+99)
	98	Pu-239 Fissile Gram Equivalent	A9 (9.999E+99)
	107	Gas Generation	A7 (9.9E+99)
	114	Total Alpha Activity	A7 (9.9E+99)
	121	Content Code	A3
	124	Certifying Site	A2
	126	PE-Ci	A7 (9.9E+99)
	133	Miscellaneous	A35
	168	WAC Exception Number	A7
	175	Certification Official's Name	A25

TABLE B-1 RECORD AND FILE LAYOUT (CONT'D)

Record	Begins in Column	Field	Field Format
3	1	Record Type	R [11 per record (25 total)]
	2	Radionuclide Symbol	A7
	9	Radionuclide Quantity	A9 (9.999E+99)
	18	Radionuclide Units	A1
4	1	Record Type	H [14 per record (14 total)]
	2	Hazardous ID Code	A4
	6	Hazardous Material Quantity	A9 (9.999E+99)
	15	Hazardous Material Qty. Units	A1

The shipper must format the data package as described in this section, convert it to ASCII, and transmit it to the host computer via IBM or IBM-compatible personal computer. The WIPP will provide the RLINK communications software, menus, and Category 4 User's Manuals to the shipping sites. The shipper must be able to retransmit the data package for 30 days if necessary, to recreate the data lost since the most recent backup in the event of a mainframe failure.

B.1.1 Record And File Format

Table B-1 shows the record and file format for shippers to use in transmitting the data package to the host computer. Each record is 200 bytes long and begins with a field identifying the record type. Record types to enter are: shipment "S", package "P", hazardous "H", and radionuclide "R". Empty fields and unused bytes in a record are filled with blanks. The sequential file will contain one shipment record, 1-42 package records, 0-1 hazardous records per waste package, and 1-3 radionuclide records per waste package, without delimiters or spaces between 200-byte records. After a package record, provide the associated radionuclide record(s) and hazardous record before the next package record. If fewer than three radionuclide records are needed, or if no hazardous record is needed, omit the unneeded records, and proceed to the next package record.

B.1.2 Transmission Of Data

The user at the shipping site will log on and transmit the data package as described in the Category 4 WWIS User's Manual. Based on the error report returned to the shipper's printer by the host computer, determine whether all records in the data package passed the WWIS edit and range checks. In accordance with the site's procedures, an authorized person will determine the correct data and modify rejected records accordingly until the data package passes the edit checks.

Note: If the shipper is having problems getting data to pass the edit and range checks, the WWIS Data Administrator can help the shipper. However, because of the differences in assigned security categories, the WWIS Data Administrator cannot change the shipper's data in the temporary data base.

If it is necessary to change a shipment number, package ID number, assembly number, Waste Acceptance Criteria (WAC) exception number, or other protected field, it will be necessary to delete the entire data package, change the data at the shipping site, and retransmit the data package.

When the data package has passed all edit and range checks and the shipment date and shipment certification date are known, the shipment is considered to be complete. The shipper must then change the shipment ready field on the shipment screen to "Y." If the entire data package has passed the edit and range checks, the "Y" will be accepted, and the shipper will be denied all further access to that data package. Otherwise, the shipper will have to resolve the error messages before the "Y" will be accepted.

The WWIS data base, to which the shipper transmits the data package, is a shared data base. Several shippers may be logged on simultaneously, but no shipper will have access to another shipper's data. In addition to being able to access a data package record-by-record via menu options for shipment data base, rejected package data base, or accepted package data base, the shipper will also have two report options: the shipment summary and the package data (by shipment).

B.1.3 Amending Data

If data in the data package require modification any time after the shipment ready field has been set to "Y," the shipper must call the Data Administrator and identify all required changes and the reasons why those changes are necessary. The Data Administrator will then transfer the shipment to the

production data base (if this has not been done) and change the data, identifying the reasons for changes. The WWIS audit data base tracks all additions, deletions, and changes to the production data base and the reasons given for those changes.

B.2 SHIPMENT DATA FORMAT

The shipper shall provide the shipment data described in Section B.1 in the format specified in Tables B-1, B-2, and B-3 for each shipment of TRU waste to the WIPP. A shipment is defined as one railcar or truck.

B.2.1 Shipment Number

The shipper shall assign a unique shipment number to each shipment. The shipment number consists of the 2-letter shipping site identification code specified in Table B-3, followed by the last two digits of the year of shipment to the WIPP and the next consecutive 4-digit shipment number for the site.

Example: Enter Rocky Flats shipment 5 in 1991

RF910005

B.2.2 Shipment Date

The 6-number shipment date is entered in YYMMDD format.

Example: Enter a May 12, 1991, shipment date.

910512

TABLE B-2 SHIPMENT/TRANSPORTATION DATA FIELD

Variable Name	Format	Limits
Shipment Number	AAYY9999	Enter 2-letter shipper site code, last 2 digits of the year, and 4-digit shipment number.
Shipment Date	YYMMDD	Enter last 2 digits of the year, 2-digit month, and 2-digit day of the month.
Vehicle Type	(A1)	Enter "R" for rail or "T" for truck.
Waste Type	(A2)	Enter "CH" for contact-handled or "RH" for remote-handled.
Shipment Certification Date	YYMMDD	Enter the last 2 digits of the year, 2-digit day of the month when the shipment was certified for transport to the WIPP.
TRUPACT/Cask Number	(A3)	Enter 3-character alphanumeric number of the TRUPACT-II, cask, or other Type B container used to transport the shipment. Only TRUPACT-II is currently authorized for transporting waste to the WIPP.
Package Assembly Number	AAYY9999	Enter 2-letter site ID code, last 2 digits of the year, and 4-digit package assembly number. If a package assembly is not used, leave the field blank.

TABLE B-2 SHIPMENT/TRANSPORTATION DATA FIELD (cont'd)

Variable Name	Format	Limits
TRUPACT APC Certifier	(A25)	Enter last name, first name, and (if available) middle initials of official certifying that TRUPACT-II Approved Payload Compliance (APC) requirements were met for the shipment. Enter "NONE" for RH shipments.

TABLE B-3 GENERATOR/SHIPPER/CERTIFIER SITE IDENTIFICATION CODES

Site Name	Site Identifier Code
Argonne National Laboratory (East)	AE
Argonne National Laboratory (West)	AW
Battelle - Pacific Northwest Laboratory	BP
Hanford (small offsite generators shipping for interim storage)	HF
Idaho National Engineering Laboratory	ID
Los Alamos National Laboratory	LA
Lawrence Livermore National Laboratory	LL
Mound	MD
Nevada Test Site	NT
Oak Ridge National Laboratory	OR
Rocky Flats Plant	RF
Richland Hanford	RH
Savannah River Plant and Laboratory	SR
Waste Isolation Pilot Plant (WIPP)	WI

Note: This list will be expanded if other generator/shipper/certifier sites are authorized to transport TRU waste to the WIPP.

B.2.3 Vehicle Type

The vehicle type is either "R" for railcar or "T" for truck.

Example: Enter vehicle type for a truck shipment.

T

B.2.4 Waste Type

The waste type is either "CH" for contact-handled TRU waste or "RH" for remote-handled TRU waste.

Example: Enter waste type for a shipment of CH-TRU.

CH

B.2.5 Shipment Certification Date

The shipment certification date is the date when the entire shipment was certified for transport to the WIPP, as opposed to the dates of certification for the individual waste packages. The date is entered in YYMMDD sequence.

Example: Enter a shipment certification date of June 12, 1991.

910612

B.2.6 TRUPACT/Cask Number

For each waste package, the shipper shall provide the 3-character alphanumeric number of the TRUPACT, cask, or other Type B shipping container used to transport the shipment. If the Type B shipping container has a serial number longer than three characters, enter the first three as the

TRUPACT/Cask Number, and enter the entire serial number in the Additional Data field. If the TRUPACT or cask is bar coded, the bar code and the TRUPACT numbers will be identical.

Example: Enter TRUPACT 201.

201

B.2.7 Package Assembly Number

For each CH-TRU waste package which is shipped in a waste package assembly (e.g., seven pack), the shipper shall provide the unique package assembly number. It will consist of the 2-letter site identification code listed in Table B-3 followed by the last two digits of the year and the 4-digit package assembly number.

If the waste package is not a waste package assembly, the shipper will leave this field blank.

When the interim storage site (rather than the generating site) packages drums into a waste package assembly, the interim storage site assigns the waste package assembly number.

Example: Enter INEL package assembly 15 for 1991

ID910015

B.2.8 TRUPACT Approved Payload Compliance (APC) Certifier

The name of the official who certified that the TRUPACT APC requirements were met for every TRUPACT containing waste in that shipment shall be entered as follows: last name plus first and (if available) middle initials. This is a 25-character field. If TRUPACTs are not being used in this shipment enter "NONE".

Example: Enter A.G. Evans as TRUPACT APC certifier.

EVANS AG

B.3 WASTE PACKAGE DATA FORMAT

The shipper shall provide the waste package data described in Section B.1 in the format specified in Tables B-1, B-3, B-4, and B-5 for each waste package in each shipment.

B.3.1 Package ID Number

Each waste package shall have a unique package identification number. It will consist of the 2-letter site identification code listed in Table B-3 followed by the 11-character (maximum) alphanumeric package number.

If a waste package is bar coded, the bar code and waste package identification numbers will be identical.

Example: For RF-generated waste, enter the package ID number for drum 74120302011.

RF74120302011

B.3.2 Container Code

A 3-digit container code shall be entered to identify the type of container or RH canister used for this package. The codes listed in Table B-5 are the containers currently approved for use. For Type A packaging not listed in Table B-5, contact the WWIS Data Administrator at the WIPP for assignment of a container code prior to shipping the unlisted Type A packaging to the WIPP.

Example: Enter container code for a 55-gal. DOT 17C drum.

001

TABLE B-4 WASTE PACKAGE DATA FIELDS

Variable Name	Format	Limits
Package ID Number	AAXXXXXX XXXXX	Enter 2-letter site identifier code followed by a maximum 11-character ID for the individual waste package.
Container Code	999	Enter the WIPP-assigned numerical code for approved TRU containers and RH canisters.
Shipment Number	AAYY9999	Enter 2-letter shipper site code, last 2 digits of the year, and 4-digit shipment number.
Closure Date	YYMMDD	Enter last 2 digits of the year, 2-digit month, and 2-digit day of the month.
TRUPACT/Cask Number	(A3)	Enter 3-character alphanumeric number of the TRUPACT, cask, or other Type B container used to transport the shipment.
Waste Type	(A2)	Enter "CH" for contact-handled or "RH" for remote-handled.
Package Assembly Number	AAYY9999	Enter 2-letter site ID code, last 2 digits of the year, and 4-digit package assembly number. If a package assembly is not used, leave the field blank.

TABLE B-4 WASTE PACKAGE DATA FIELDS (cont'd)

Variable Name	Format	Limits
Package Certification Date	YYMMDD	Enter the last 2 digits of the year, 2-digit month, and 2-digit day of the month.
Internal RH-TRU Container	9	Enter code for internal containers placed in the RH canister: 0 for none, 1 for 30-gal. drum, and 2 for 55-gal. drum. For CH-TRU, enter 0.
Weight	9.9E+99	Enter in scientific notation the weight in kg of the waste package.
Organic Materials Weight	9.9E+99	Enter in scientific notation the weight in kg of organic materials in the CH-TRU waste. For RH-TRU, or if CH-TRU contains no organic materials, leave the field blank.
Organic Materials Volume Percent	999	Enter the volume percent of organic materials per volume of CH-TRU waste. For RH-TRU, or if CH-TRU estimate to nearest 10 percent is 0, leave the field blank.
Surface Dose Rate	9.9E+99	Enter in scientific notation the total surface dose rate in mrem/hr.

TABLE B-4 WASTE PACKAGE DATA FIELDS (cont'd)

Variable Name	Format	Limits
Neutron Contribution	9.9E+99	Enter in scientific notation the neutron surface dose rate in mrem/hr if it exceeds the reportable limit specified in Section 3.4.4 of this document; otherwise leave the field blank.
Thermal Power	9.9E+99	Enter in scientific notation the measured or calculated thermal power (in watts) for all RH-TRU and for CH-TRU if the thermal power density is greater than 0.1 W/cu ft; otherwise, leave the field blank for CH-TRU.
Pu-239 Fissile Gram Equivalent	9.999E+99	Enter in scientific notation the Pu-239 fissile gram equivalent.
Gas Generation	9.9E+99	Enter in scientific notation the gas generation rate. This field is for future use and shall be left blank at present.
Total Alpha Activity	9.9E+99	Enter in scientific notation the total curies of alpha activity for CH-TRU; enter 0.0E+00 for RH-TRU.
Content Code	999	Enter the WIPP approved numeric content code.

TABLE B-4 WASTE PACKAGE DATA FIELDS (cont'd)

Variable Name	Format	Limits
Certifying Site	(A2)	Enter 2-letter site ID code.
PE-Ci	9.9E+99	Enter in scientific notation the PE-Ci of activity.
Miscellaneous	(A35)	Enter in this free field additional data considered significant by the shipper.
WAC Exception Number	AAYYXXX	Enter the WAC exception number, if granted, otherwise leave the field blank. Format is 2-letter site code plus last two numbers of the year the request was made plus a sequential number (beginning with one each year).
Certification Official's Name	(A25)	Enter last name, first name, and available) middle initials of official who certified the waste package.
Radionuclide Data (occurs 1 to 25 times)		
Radionuclide Symbol	(A7)	Enter radionuclide symbol.
Radionuclide Quantity	9.999E+99	Enter quantity of radionuclide.
Radionuclide Units	(A1)	Enter G for grams or C for curies.

TABLE B-4 WASTE PACKAGE DATA FIELDS (cont'd)

Variable Name	Format	Limits
Hazardous Material Data (occurs 0 to 14 times)		
Hazardous Material ID Code	(A4)	Enter code found in 40 CFR Part 261, Subparts C and D. Leave field blank if none.
Hazardous Material Quantity	9.9E+99	Enter in scientific notation the quantity of hazardous material present in the waste. Leave field blank if none.
Hazardous Material Quantity Units	(A1)	Enter L for liters, G for grams, or blank if none.

TABLE B-5 APPROVED TRU WASTE CONTAINERS AND CODES

Code	Container Description
001	Standard 55-gal. (208-L) metal drum (DOT Spec. 17C and 17H)
002	Rectangular metal box (74.4 X 50.5 X 38.5 in. LWH)
003	Rectangular metal box (68 X 54 X 38.5 in. LWH)
004	Rectangular metal box (88 X 54 X 54 in. LWH)
005	Rectangular metal box (71 X 57 X 52.5 in. LWH)
006	Standard 55-gal. (208-L) metal drum (DOT Spec. 6M)
007	Rectangular metal box (50.4 X 58.4 X 72.4 in. LWH)
008	Rectangular metal box (4 X 4 X 7 ft. LWH)
009	Standard Waste Box (37 in. high X 71 in. long OD/54.25 in. short OD X 45.06 in. side)
101	H-2-91273-1 RH canister, 121-in. long X 26-in. OD
102	H-2-91284-1 RH canister, 121-in. long X 26-in. OD

Notes: 1. The generator or shipper shall request a container code from the WWIS Data Administrator at the WIPP prior to shipping to the WIPP any Type A packaging not listed above.

2. For data on RH canisters, see RHO-RE-MA-7, "User's Manual for Remote Handled Transuranic Waste Container," Rockwell International, Rockwell Hanford Operations, September 1984.

B.3.3 Shipment Number

The shipper shall assign a unique shipment number to each shipment. The shipment number consists of the 2-letter shipping site identification code specified in Table B-3, followed by the last two digits of the year of transport to the WIPP and the next consecutive 4-digit shipment number for the site.

Example: Enter Rocky Flats shipment 5 in 1991

RF910005

B.3.4 Closure Date

The shipper shall provide the date when the waste package was closed in YYMMDD format.

Example: Enter a closure date of July 12, 1991.

910712

B.3.5 TRUPACT/Cask Number

For each waste package, the shipper shall provide the 3-character alphanumeric number of the TRUPACT, cask, or other Type B shipping container used to transport the shipment. If the Type B shipping container has a serial number longer than three characters, enter the first three as the TRUPACT/Cask Number, and enter the entire serial number in the Additional Data Field. If the TRUPACT or cask is bar coded, the bar code and the TRUPACT numbers will be identical.

Example: Enter TRUPACT 201.

201

B.3.6 Waste Type

The waste type is either "CH" for contact-handled TRU waste or "RH" for remote-handled TRU waste.

Example: Enter waste type for a shipment of CH-TRU.

CH

B.3.7 Package Assembly Number

For each CH-TRU waste package which is shipped in a package assembly (e.g., seven pack), the shipper shall provide the unique package assembly number. It will consist of the 2-letter site identification code listed in Table B-3 followed by the last two digits of the year and the 4-digit package assembly number.

If the waste package is not a package assembly, the shipper will leave this field blank.

When the interim storage site (rather than the generating site) packages drums into a package assembly, the interim storage site assigns the package assembly number.

Example: Enter INEL package assembly 15 for 1991

ID910015

B.3.8 Package Certification Date

The date when the certifying official signed the certification statement for this package shall be entered in YYMMDD format.

Example: Enter an October 12, 1992, package certification date.

921012

B.3.9 Internal RH-TRU Container

The shipper shall indicate the waste packages, if any, internal to the RH canister. This parameter will be used to check the nuclear material loading of the canister. If the internal containers are 30-gal. drums, enter 1; if 55-gal. drums, enter 2; otherwise enter 0. For CH-TRU, enter 0.

Example: Enter for 55-gal. drums as internal containers.

2

B.3.10 Weight

Each waste package shall be weighed, and the gross weight of the waste package (in kilograms) shall be entered using scientific notation. It must be in the format 9.9E+99.

Example: Enter a weight of 537 kg.

5.4E+02

B.3.11 Organic Materials Weight

The weight (in kilograms) of organic materials in the CH-TRU waste package shall be entered to two significant figures using scientific notation. It must be in the format 9.9E+99. If no organic material is present, or if it is an RH-TRU waste package, leave the field blank.

Example: Enter an organic weight of 47 kg.

4.7E+01

B.3.12 Organic Materials Volume Percent

The percentage of the volume of the waste package occupied by the organic materials, estimated to the nearest 10 percent, shall be entered as a 3-digit number. For RH-TRU, or if CH-TRU estimate to the nearest 10 percent is 0, leave the field blank.

Example: Enter an organic materials volume percent of 22.

020

B.3.13 Surface Dose Rate

The maximum surface dose rate reading, including the neutron contribution, (in mrem/hr) for the waste package shall be entered to two significant figures using scientific notation. It must be in the format 9.9E+99.

Example: Enter a surface dose rate of 18 mrem/hr.

1.8E+01

B.3.14 Neutron Contribution

The neutron contribution to the maximum surface dose rate (in mrem/hr) shall be entered if it exceeds the reportable limits as specified in Section 3.4.4 of this document. It shall be entered to two significant figures using scientific notation. It must be in the format 9.9E+99. If the neutron contribution is less than the reportable limit, leave the field blank.

Example: Enter a neutron contribution of 65 mrem/hr.

6.5E+01

B.3.15 Thermal Power

The total thermal generating capacity (in watts) of the waste package must be entered for all RH-TRU and for CH-TRU if the thermal power density exceeds the reportable limit as specified in Section 3.4.6 of this document. It shall be entered to two significant figures using scientific notation. It must be in the format 9.9E+99. If the thermal power is less than the reportable limit for CH-TRU, leave the field blank. The generator or shipper shall use the values in Table 10.1 of Appendix 1.3.7 of the TRUPACT-II SARP, (Reference 9) for reference values.

Example: Enter a thermal generating capacity of 8.3 W.

8.3E+00

B.3.16 PU-239 Fissile Gram Equivalent

The Pu-239 fissile gram equivalent content of the waste package must be reported. It must be entered to four significant figures using scientific notation in the format 9.999E+99.

Example: Enter Pu-239 fissile gram equivalent of 125.5 g.

1.255E+02

B.3.17 Gas Generation

The WWIS contains a field for reporting gas generation or gas generation rate if needed in the future. It is designed as a seven-character number to be reported in scientific notation in the format 9.9E+99. This field is part of the data package file structure, but it shall be left blank at present.

B.3.18 Total Alpha Activity

The total alpha activity (in curies) for the CH-TRU waste package must be entered to two significant figures using scientific notation in the format 9.9E+99. Enter 0.0E+00 for RH-TRU.

Example: Enter total alpha activity of 17 Ci.

1.7E+01

B.3.19 Content Code

A content code shall be used to describe the contents of the waste package. These content codes will be prepared by each site and stated in the certification plan. The content code will be a 3-character code. If the content code is longer than three characters, enter the first three characters as the content code and the entire content code number in the additional data field.

Example: Enter a content code of 804

804

B.3.20 Certifying Site

The site where the waste package was certified shall be identified by the 2-character site code. See Table B-3 for site codes. WIPP needs this information for use (1) with the name of the official who certified the waste package (Section B.3.24) and (2) with the content code to ensure that unique content codes are available for reporting. Thus, if two sites have an identical content code, the WIPP can report on them separately by concatenating with the certifying site code (e.g., ID804 and RF804).

Example: Enter Rocky Flats as certifying site.

RF

B.3.21 PE-Ci

The maximum PE-Ci contained in the waste package shall be entered to two significant figures using scientific notation in the format 9.9E+99.

Example: Enter a PE-Ci content of 9.5 PE-Ci.

9.5E+00

B.3.22 Miscellaneous

This 35-character alphanumeric field is a free field for the shipper to enter any additional information deemed useful or necessary for the WIPP. If this field is not needed for given waste package, leave it blank.

B.3.23 WAC Exception Number

If a shipper has been granted an exception to the WAC for a waste package, the WAC exception number shall be entered in the data package. The format of this field is the 2-character site code plus the last two numbers of the year the request was made plus a sequential number (beginning with one each year).

B.3.24 Certification Official's Name

The name of the official who certified the waste package shall be entered as follows: last name, first name, and (if available) middle initials. This is a 25-character field.

Example: Enter George S. Marshall's name as certifying official.

MARSHALL GS

B.4 Radionuclide Data

The three radionuclide data fields shall be entered from 1 to 25 times. Radionuclides to be reported may be individual radionuclides, standard mixtures (e.g., Pu-52), or mixtures with unspecified weight percents and radionuclides [e.g., mixed activation products (MAP) and mixed fission products (MFP)]. WWIS contains a reference table of standard mixtures and the weight percentages of the constituent radionuclides (as currently reported to the Idaho National Engineering Laboratory) for use in calculations. Consequently, if a site wishes to report a new mixture, or if the weight percentages of constituent radionuclides change, it will be necessary to notify the WIPP in advance. If a metastable radionuclide is being reported, indicate it by an "M" as the last character of the radionuclide symbol.

B.4.1. Radionuclide Symbol. From 1 to 25 radionuclides shall be reported for each waste package. The radionuclide symbol is a 7-character field.

Example: Enter the radionuclide symbol for plutonium-239.

PU-239

B.4.2. Radionuclide Quantity. Radionuclide quantity shall be entered in scientific notation in the format 9.999E+99.

Example: Enter radionuclide quantity of 10.

1.000E+01

B.4.3. Radionuclide Units. Radionuclide units of measure shall be reported as "G" for grams or "C" for curies. Units for standard mixtures shall be reported in grams and MAP or MFP in curies.

Example: Enter the unit grams

G

B.5 Hazardous Material Data Format

The three hazardous material fields shall be entered from 0 to 14 times.

B.5.1. Hazardous Material ID Code. Hazardous materials shall be identified by entering the 4-character alphanumeric identification code for the hazardous material present in the package. Neutralized corrosives do not require identification. The codes can be found in 40 CFR Part 261, Subparts C and D. If no hazardous material is present, leave the field blank.

Example: Enter identification code for mercury

D009

B.5.2. Hazardous Material Quantity. Hazardous quantities are not currently required to be reported in this field to satisfy the agencies that regulate WIPP. If data exists to substantiate an actual hazardous material quantity, then the generator can report that quantity. Otherwise, enter zero (0.0E+00) in this field to signify either unknown or unmeasured hazardous material present, and either G or L in the Hazardous Units Field to satisfy the current database requirement for data in all three fields when a hazardous code is reported. Headspace concentration data are not to be reported in lieu of solid and solidified waste analyses. If no hazardous material is present, leave the field blank.

B.5.3. Hazardous Material Quantity Units. The units for hazardous material quantity shall be entered as L for liters, G for grams, or blank for none.

Example: Enter units for 7.2E+00 grams of material.

G

B.4 DUNNAGE IN SHIPMENTS

If an empty drum is used as dunnage to complete a seven pack in a shipment to the WIPP, the drum shall be labeled (1) "EMPTY" or "DUNNAGE" and (2) with a package ID number as required in Section B.3.1. The empty drum shall be reported by package ID number in the data package. Wherever possible, actual data shall be reported for a dunnage drum. In fields where there are no values to report because the drum is empty, report zeros or leave the fields blank as allowed for that field in Section B.3 of this document. Enter zero for the content code, the shipping site ID for the certification site, "NONE" for the certifying official's name, shipment date for both the certification date and closure date, weight of the empty drum for the package weight, "EMPTY" for the radionuclide symbol, and either G or C for the radionuclide units of measure.

If a waste package assembly (e.g., seven pack) of empty drums is shipped as dunnage to fill a TRUPACT, label the drums as "EMPTY" or "DUNNAGE," but do not label them with package ID numbers or include them in the data package.

APPENDIX C

PAYLOAD ASSEMBLY CRITERIA

REPRODUCED FROM TRUPACT-II SARP,

APPENDIX 1.3.7, SECTION 13

13.0 PAYLOAD ASSEMBLY CRITERIA

This chapter presents an overview and the control procedures that shall be used by the sites in order to assemble a payload approved for transport in TRUPACT-II. The parameters described in previous chapters must be evaluated according to the constraints in Section 1.2.3 of the SAR for selection of a payload. Flowcharts showing the steps for load management of payloads are also presented in this chapter. U.S. DOE sites shall implement these flowchart requirements by the methods that have been outlined in this document.

13.1 Payload Assembly Restrictions

Only content codes described in the TRUCON document (Ref. 13.5.1) shall be transported in TRUPACT-II. The assignment of each of these content codes to a payload shipping category is provided in the TRUCON document. The logic for this classification is presented in Section 1.2.3.2 of the SAR. Together, these documents (TRUCON, TRAMPAC, and relevant sections of the SAR) present the foundation, justification and the verification of this classification. The correlation chart of content codes and shipping categories is shown in Table 5 of the TRUCON document. The shipping categories impose restrictions and requirements on the manner in which a payload can be assembled. These are listed below:

- After all the payload parameters have been quantified and verified, the shipping category shall be clearly marked on the payload container, to provide a visual verification that the container is authorized for shipment.

- All containers forming a payload within each TRUPACT-II shall belong to the same shipping category. This precludes the mixing of different Waste Material Types I.1, I.2, I.3, II.1, II.2, III.1 and IV, different payload containers (drums and SWBs), and different internal packaging configurations (number of bag layers). This requirement also applies

for up to four drums overpacked in an SWB, each of which shall belong to the same shipping category. The shipping category shall be marked on the SWB. The site transportation certification official shall verify that there is no mixing of shipping categories within a payload.

- Payload containers qualified for transport in the analytical and test categories cannot be mixed in a TRUPACT-II package.

- Transportation parameters of individual payload containers are recorded in the database or records. An example of this data is shown in Table 13-1 for the analytical case and in Table 13-2 for the test category. A payload container shall be certified for transport only if all the transportation parameters are in compliance. It shall be the responsibility of the site transportation certification official to verify this compliance before authorizing containers for transport. A step by step instruction for completing Tables 13-1 and 13-2 is given in Section 13.3.1 and 13.3.2.

- The transportation parameters of every TRUPACT-II shipment shall be recorded in the database. An example of this data sheet is shown in Table 13-3. A TRUPACT-II shipment shall be authorized only if all the transportation parameters are in compliance. It shall be the responsibility of the site transportation certification official to verify this compliance before authorizing the TRUPACT-II for transport. A step by step instruction for completing Table 13-3 is given in Section 13.3.3.

13.2 Flowcharts for Load Management

13.2.1 Assignment of Shipping Category

The methodology by which a shipping category is assigned to a content code is shown in Figure 13-1. Procedural and administrative controls at a waste

TABLE 13-1

PAYLOAD CONTAINER TRANSPORTATION CERTIFICATION DOCUMENT (PCTCD)
(ANALYTICAL PAYLOAD SHIPPING CATEGORY)

Container I.D. #: _____ Payload Shipping Category: _____

Content Code: _____ Decay Heat Limit for Category: _____

Container Type: WAC Certified: _____

Drum _____ Liner Punctured/Filtered: _____

SWB _____ Certification Site: _____

Filter(s) Model: _____ Correct Filter Installed: _____

RETRIEVABLY STORED WASTE ONLY:

- Aspiration Method: Option 1 _____ Option 2 _____ Option 3 _____
- Period of Time Container Closed Prior to Venting _____ (Option 1 Only)
- Hydrogen Concentration in Headspace: _____ (Option 2 or Option 3)
- Period of Aspiration: _____ Table: _____
- Payload Container has Vented the Indicated Period of Time _____

Container Weight _____ + Error _____ = _____

Container Decay Heat_____ + Error _____ = _____

Container Fissile Mass_____ + Two Times the Error _____ = _____

Approved for Shipment_____

I certify that the above container meets the requirements for shipment in TRUPACT-II.

_____
TRANSPORTATION CERTIFICATION OFFICIAL

_____
DATE

TABLE 13-2

PAYLOAD CONTAINER TRANSPORTATION CERTIFICATION DOCUMENT (PCTCD)
(TEST PAYLOAD SHIPPING CATEGORY)

Container I.D. #: _____ Payload Shipping Category: _____

Content Code: _____ Decay Heat Limit for Category: _____

Container Type: WAC Certified: _____

Drum _____ Liner Punctured/Filtered: _____

SWB _____ Certification Site: _____

Filter(s) Model: _____ Correct Filter Installed: _____

TEST CRITERIA:

Limit for Total Gas Generation: _____ Measured Gas Generation Rate: _____

Limit for Hydrogen Gas Generation: _____ Measured Hydrogen Generation Rate: _____

Limit for Flammable Volatile Organics Concentration: _____ Concentration of Flammable VOCs Present: _____

Container Weight _____ + Error _____ = _____

Container Decay Heat_____ + Error _____ = _____

Container Fissile Mass_____ + Two Times the Error _____ = _____

Approved for Shipment_____

I certify that the above container meets the requirements for shipment in TRUPACT-II.

_____
TRANSPORTATION CERTIFICATION OFFICIAL

_____
DATE

TABLE 13-3

PAYLOAD ASSEMBLY TRANSPORTATION CERTIFICATION DOCUMENT (PATCD)

TRUPACT OCA BODY NO.: _____ SHIPMENT NO.: _____

TRUPACT OCA LID NO.: _____

PAYLOAD SHIPPING CATEGORY: _____

DECAY HEAT LIMIT FOR SHIPPING CATEGORY: _____

PAYLOAD CONTAINER CONFIGURATION: _____ (DRUM, SWB OR OVERPACK)

PAYLOAD COMPOSITION

BOTTOM 7 DRUMS OR SWB

PAYLOAD CONTAINER I.D. NO.	WEIGHT	ERROR	FISSILE GRAMS	ERROR**	DECAY HEAT	ERROR
		*				
Sub-Total						

*Error on total weight can be determined by weighing the entire payload assembly.

**Two times the error from individual payload containers.

TABLE 13.3 (Continued)

TOP 7 DRUMS OR SWB

PAYLOAD CONTAINER I.D. NO.	WEIGHT	ERROR	FISSILE GRAMS	ERROR**	DECAY HEAT	ERROR
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
Subtotal	_____	_____*				

TOTAL FISSILE QUANTITY (WITH ERROR) OF ALL CONTAINERS: _____

TOTAL DECAY HEAT (WITH ERROR) OF ALL CONTAINERS: _____

BOTTOM SEVEN DRUMS OR SWB WEIGHT (WITH ERROR)
≥ TOP SEVEN DRUMS OR SWB WEIGHT (WITH ERROR): _____

TOTAL WEIGHT (WITH ERROR) OF PAYLOAD AND PACKAGE: _____

MAXIMUM DOSE RATE ON THE OUTSIDE OF PACKAGE: _____ AT 2 METERS _____

DATE OF ICV CLOSURE _____

APPROVED FOR SHIPMENT _____

I certify that all of the above containers meet the requirements for shipment in TRUPACT-II.

_____
TRANSPORTATION CERTIFICATION OFFICIAL

_____
DATE

*Error on total weight can be determined by weighing the entire payload assembly.
**Two times the error from individual payload containers.

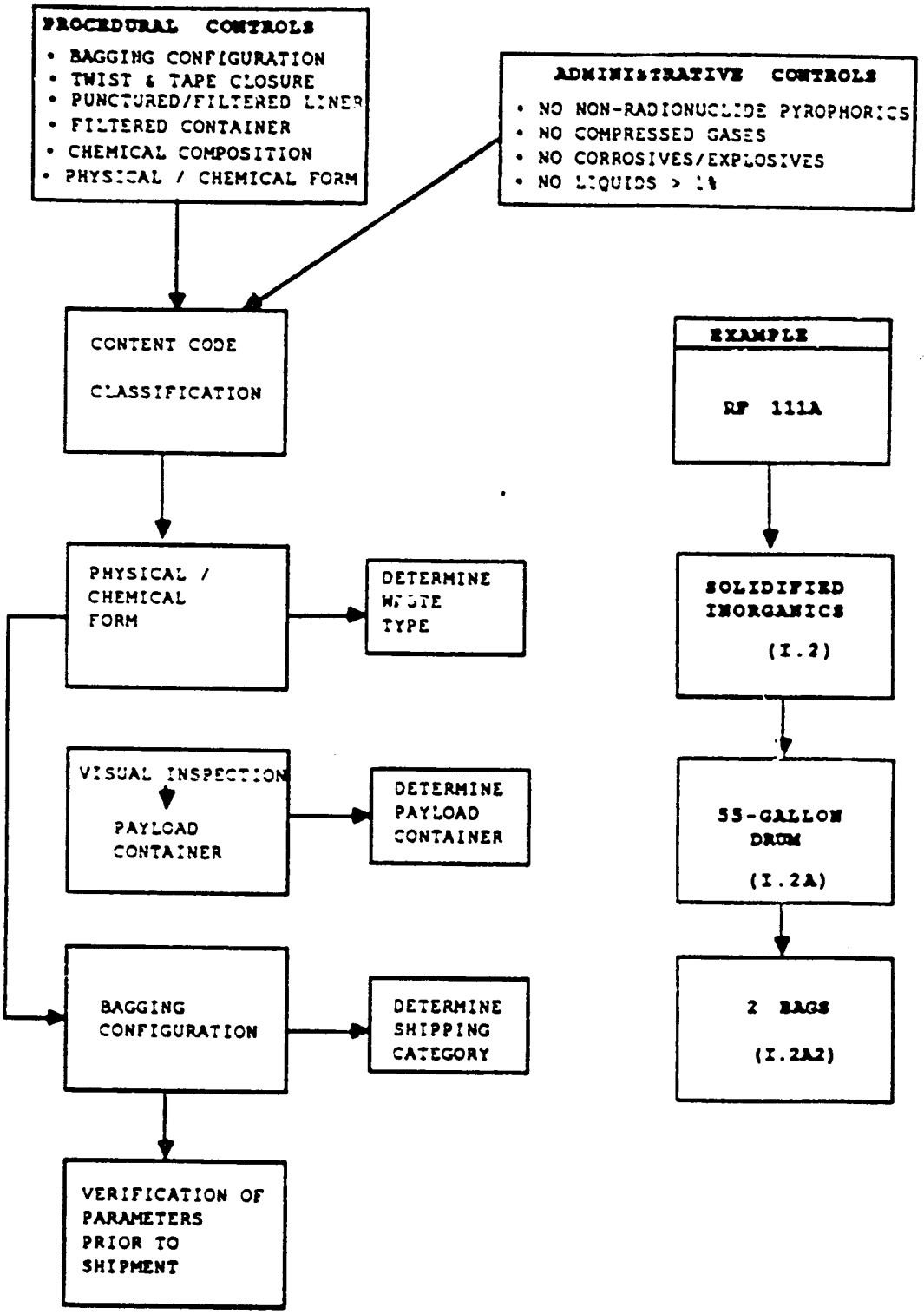

Figure 13.1 Assignment of Shipping Categories

generator site shall specify for each content code, the transportation parameters that have been described in previous chapters. Knowing the content code of the waste determines its physical and chemical form, and compliance with the transportation requirements. A visual inspection shall determine the type of payload container, and the bagging configuration follows from the content code description. These parameters shall lead to the assignment of a shipping category to the content code. An example of this correlation between a content code and a shipping category is shown in Figure 13-1. The TRUCON document is a comprehensive description of this flowchart for all content codes that are allowed to be transported from all the DOE sites.

13.2.2 Payload Selection

The flowchart of transport requirements for a payload container is shown in Figure 13-2. The container I.D. shall uniquely identify the payload container. The content code shall identify a shipping category per TRUCON which is confirmed if all the limits on the parameters are met. Wherever applicable, the parameters (weight, fissile material, and the decay heat) shall be checked against the limits after addition of the appropriate error. If any of the limits are not met by the container, it shall be rejected from transport, marked, and segregated. If all requirements are satisfied except for the decay heat limit, the container shall be assigned to a test category, and can be qualified for transport only by the procedure outlined in Attachment 2.0. If all transport requirements are satisfied, the shipping category shall be confirmed and labeled on the container.

13.2.3 TRUPACT-II Transport Criteria

The logic for selecting a TRUPACT-II payload is presented in Figure 13.3. Payload selection shall be made from only those payload containers that have been approved for shipment. Individual containers shall be selected from the

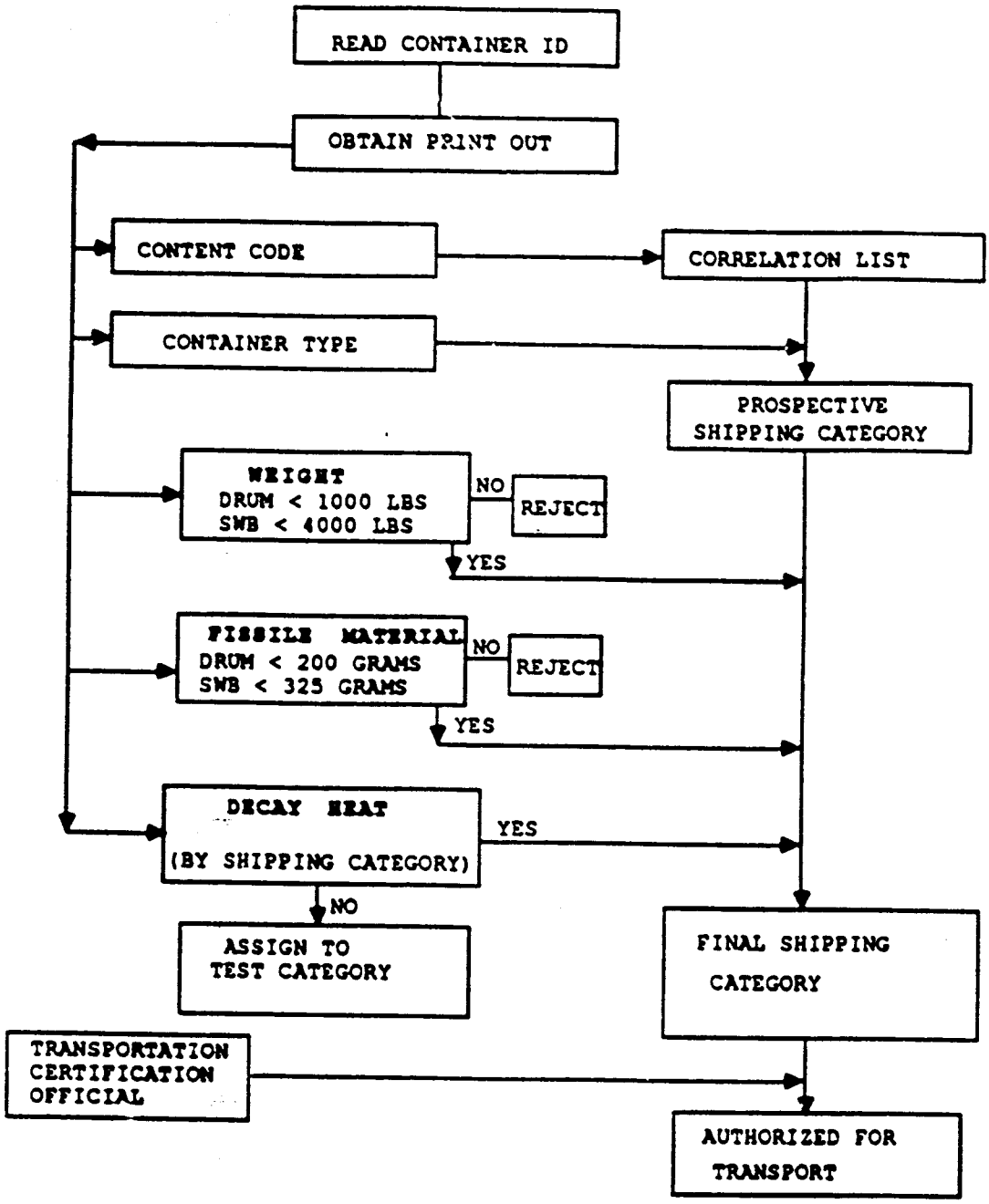

Figure 13.2 Payload Selection

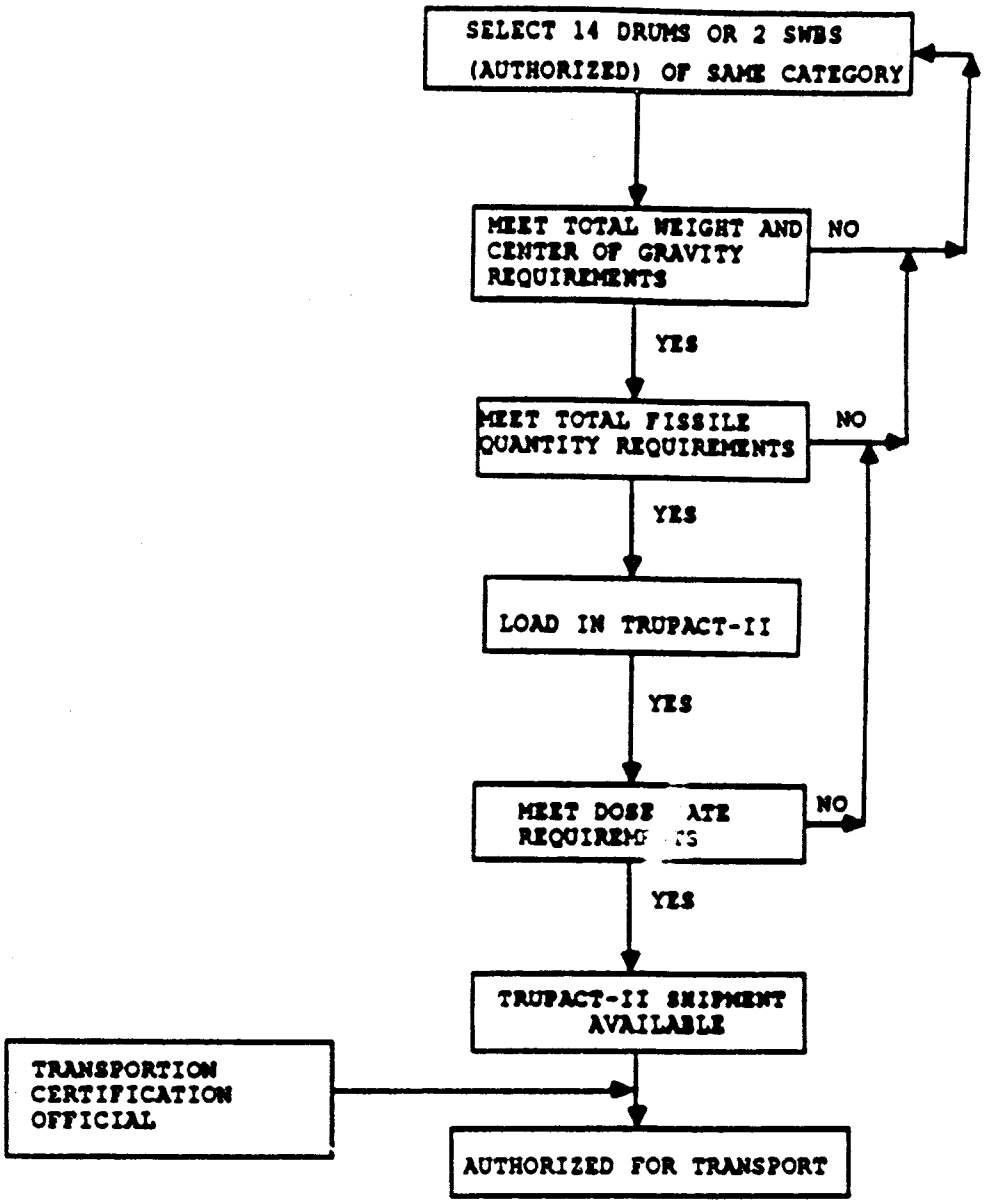

Figure 13.3 TRUPACT-II Shipping Criteria

same shipping category such that the weight and fissile quantity limits on the total TRUPACT-II payload are met. The containers shall be loaded into the TRUPACT-II with the heavier seven-pack or SWB placed in the bottom to satisfy the center of gravity criteria. If the dose rate requirements are met on the loaded TRUPACT-II, it shall be authorized for shipment by the site transportation certification official.

13.3 Procedure for Certifying Authorized Payloads for TRUPACT-II

All authorized payloads must meet the requirements set forth in Section 1.2.3 of the SAR. Data on the parameters for specific payloads is obtained by the methods outlined in this document in accordance with the specific limits of the TRUCON document. The following procedures give step by step methods for evaluating the data against the limits set forth in Section 1.2.3 of the SAR.

13.3.1 Procedure for Certifying Individual Payload Containers for Transport in the TRUPACT-II (analytical case)

U.S. DOE waste generating and storage sites shall qualify an individual payload container for transport in TRUPACT-II by verifying that each container meets the parameter requirements/limits listed in Table 13.1, Payload Container Transportation Certification Document (PCTCD) Analytical Case.

The attached form (Table 13.1) may be reformatted for site use. All parameters noted on the form must be included in modified versions.

Listed below is an outline of the procedure to follow for qualification of a payload container for transport (Table 13.1). References in parenthesis are to chapters in this document (TRAMPAC). The procedure to follow is:

- Container I.D.: The identification number is unique to each container of waste and provides a means for tracking process data records and

package history. The container identification number is assigned to the container prior to placement of waste in a container. The I.D. number appears on a label affixed to the drum and can be read for visual verification or for electronic retrieval (i.e., bar codes). Information necessary for transporting payload containers is entered into the data package under this I.D. number.

- Container Type: This information may be obtained by visual inspection. The container must be one of the approved types listed in Section 1.2.3, Table 1.2.3.2-4 of the SAR (Section 8.0).

- Container Weight: The loaded weight of each payload container is obtained from its data package (Section 11.0).

- Container Weight + Error: An error (Section 11.0) shall be assigned to the container weight in accordance to the methods listed in Chapter 8.0 and entered into the data package. This resulting value shall be compared to those limits listed in the Section 1.2.3.3 of the SAR to ensure compliance.

- Certification Site: This is the location at which transportation certification takes place. For newly generated waste this will be the generating site. For retrievably stored waste it may be either the generating or storage site.

- Content Code: This information may be obtained one of two ways: First method is to acquire the content code from the data package, where the content code has been preassigned, or

  If the content code is not available in the data package but the Item Description Code (IDC) is listed on the container, the transportation certification official shall use the correlation tables listed in the TRUCON document (Ref. 13.5.1) to determine the content code.

- If an IDC is not listed in the Correlation Tables of the TRUCON, the payload container is not eligible for shipment. The generator who assigns the IDC is responsible for ensuring that the parameters listed in the TRUCON for that IDC are met (i.e., maximum number of bags, method of closure, waste form verification, chemical compatibility, etc). The site transportation certification official shall verify that the proper IDC is assigned to the content code using the correlation tables in the TRUCON document.

- Shipping Category: The site transportation certification official shall ensure that the proper shipping category is assigned to the payload container. This assignment is made in the TRUCON document. Each content code lists the shipping category under which it shall be shipped. The transportation certification official must verify this assignment using the corresponding tables in TRUCON. If the content code is not listed in the TRUCON document it is not eligible for shipment.

  Payload for all containers should not contain greater than 500 ppm total flammable organics in the headspace of each payload container.

- Decay Heat Limit: When the shipping category is determined, the allowable decay heat for that category shall be recorded from Tables 1.2.3.3-1 to 1.2.3.3-3 of Section 1.2.3.3 of the SAR.

- Decay Heat: The decay heat of each payload container shall be calculated by combining the isotopic inventory data and the calculated decay heat for each radionuclide present in the waste (Section 10.0). This information shall be obtained by the site transportation certification official from the data package.

- Decay Heat + Error: The decay heat + error shall be obtained (Section 10.0) by the transportation certification official from the data package. The transportation certification official shall compare this total with the limits for the payload container's shipping category in Section 1.2.3 of the SAR.

- Fissile Mass: The Pu-239 fissile gram equivalent (FGE) is calculated (Section 9.0) by combining the isotopic inventory data and the Pu-239 FGE for each radionuclide present in the waste. This information shall be obtained by the site transportation certification official from the container I.D.'s data package.

- Fissile Mass + Two Times the Error: An error shall be assigned to the fissile mass in accordance with the methods listed in Section 9.0. This information shall be obtained from the data package by the site transportation certification official. The transportation certification official shall ensure that the fissile mass + two times the error is less than the transport limits set in Section 1.2.3 of the SAR.

- WIPP WAC Certified: This information shall be obtained from the data package corresponding to the payload container I.D. WIPP WAC certification, as it applies to this document (TRAMPAC), specifies that the following criteria have been met:

  Free liquids are limited to residual amounts. (Section 4.0)
  Non-radioactive pyrophorics are prohibited. (Section 5.0)
  Explosives are prohibited. (Section 5.0)
  Corrosives are prohibited. (Section 5.0)
  Pressurized containers are prohibited. (Section 4.0)

- Carbon Composite Filter Model Installed: This information is obtained by visual inspection (Section 8.0). The site transportation certification official shall ensure that the specifications for carbon composite filters listed in Appendix 1.3.5 of the SAR are met. The filter model number should be checked with the specification in Appendix 1.3.5. of the SAR and recorded on the data sheet. All filters installed in a SWB must meet the specifications in Section 3.0 of Appendix 1.3.5 of the SAR. All filters installed in bins overpacked in SWBs shall meet the specifications in Section 4.0 of Appendix 1.3.5 of the SAR. The second blank under carbon composite filter should be answered with a "yes" or "no" reply.

- Punctured/Filtered Liner: This information shall be obtained from the data package for the container I.D. (Section 8.0).

- Aspiration Time Determination: This part of the table ensures conformation with the requirements on aspiration time for containers that have been closed (unvented) for a period of time (Appendix 3.6.11). The five questions under this section that shall be answered (Section 8.0) are:
  - The method for determination of the aspiration period needed to qualify the payload container for transport shall be indicated.
  - The period of time that a payload container has been unvented in storage shall be recorded here (Option 1 only).
  - The concentration of hydrogen measured in the headspace shall be noted here (Options 2 and 3).
  - The aspiration time for the option chosen should be noted and the appropriate table that the value was derived from in the SAR. If the hydrogen concentration indicates that aspiration is not needed, a zero should be entered.

- Indicated here that the payload container has vented the prescribed amount of time. The answer is "yes", if the task has been accomplished.

- Approved for Transport: The site transportation certification official shall ensure that all of the requirements for the above transportation parameters are met as stated in Section 1.2.3 of the SAR. If the requirements are not met the payload container is rejected (nonconformance disposition) and not qualified for shipment.

- Transportation Certification Official: The site transportation certification official shall sign and date this document upon completion.

13.3.2 Procedure for Certifying Individual Payload Containers for Transport in TRUPACT-II (Test Category)

Payload Containers which have been assigned to the test category must meet additional criteria. These are listed in Table 13-2.

An outline of the procedure to qualify payload containers which have been assigned to the test categories follows:

- Complete items described in Table 13.1 as defined above.

- Date of Test Completion: This should be the date the test is terminated as outlined in Attachment 2.0 of Appendix 1.3.7.

- Test Criteria: The following data are obtained from the test procedure of each payload container.

- Limit for Total Gas Generation: This limit is defined for each shipping category in Table 3.4.4.3-5 of the SAR. This limit is arrived at by

setting a maximum pressure limit of 50 psig in the TRUPACT-II ICV cavity.

- Limit for Hydrogen Gas Generation: This limit is defined for each shipping category in Table 3.4.4.4-2. This limit is arrived at by limiting the maximum hydrogen concentration to <5% in all parts of the payload and the package.

- Limit for Potentially Flammable Volatile Organics Concentration: This limit is set at 500 ppm in the headspace (total flammable organics) for all payload containers.

13.3.3 Procedure for Assembly of a TRUPACT-II Payload

Certified payload containers shall be assembled per the instructions given below. Only two SWBs or 14 drums of a single shipping category can be assembled into a specific payload. The total TRUPACT-II package limits as given in Section 1.2.3 of the SAR are complied with by evaluating the data from the individual Payload Container Transportation Certification Documents (PCTCD). The data from individual payload containers is combined in accordance with the Payload Assembly Transportation Certification Document (PATCD) per the following instructions. The attached form (Table 13.2) may be reformatted for site use. All parameters noted on the form must be included in any site-modified version. References are to chapters within this document (TRAMPAC).

The procedures for assembling a payload within a TRUPACT-II are as follows:

- TRUPACT-II OCA Body No.: The identification number on the TRUPACT-II OCA Body shall be recorded.

- Shipment No.: The site transportation certification official shall record the shipment number of the trailer of TRUPACT-IIs.

- TRUPACT-II OCA LID NO.: The identification number on the TRUPACT-II OCA shall be recorded.

- Payload Shipping Category (Section 13.1): The site transportation certification official shall record the shipping category of the payload to be shipped. All of the payload containers within a TRUPACT-II must be of the same shipping category and analytically qualified containers cannot be shipped with containers qualified by test. The transportation certification official shall ensure this through visual inspection of the affixed shipping category labels on each payload container or the respective Payload Container Transportation Certification Documents (PCTCD).

- Decay Heat Limit for Shipping Category: When the payload shipping category is assigned, the allowable decay heat limits shall also be recorded in Section 1.2.3 of the SAR.

- Payload Container Configuration: The site transportation certification official shall identify and record the type of payload containers being assembled in the TRUPACT-II (Section 8.0).

- Payload Composition: The site transportation official shall record the following parameters for the PACTD from individual PCTCDs:

  - Payload Container I.D. Number

  - Weight and error

  - Fissile Gram Equivalent and two times the error

  - Decay Heat and error

The weights, fissile gram equivalent and decay heats of individual containers are summed, and the total error for each parameter shall be calculated by

utilizing the square root of the sum of the squares of the individual errors (indicated in Tables 1? 1 and 13-2). The error on the total weight can also be estimated by weighing the total payload assembly and determining the error.

- Total Fissile Quantity (With Error) of All Containers: The site transportation certification official shall calculate and record the total fissile quantity + the error for all the containers comprising a shipment (Section 9.0). The resulting total shall not exceed the limits for fissile quantity for a TRUPACT-II as stated in Section 1.2.3 of the SAR.

- Total Decay Heat (With Error) of All Containers: The site transportation certification official shall calculate and record the total decay heat + error for all the containers comprising a shipment (Section 10.0). The resulting total shall not exceed the limits set in Section 1.2.3 of the SAR for the shipping category.

- Total Weight (With Error) Of Payload and Package (Section 11.0): The site transportation certification official shall be responsible for ensuring that the total weight of the payload and package does not exceed those limits set in Section 1.2.3 of the SAR. The total error can be determined by weighing the entire payload assembly. The top seven drums or SWB shall be verified to weigh no more than the bottom seven drums or SWB.

- Dose Rate On The Outside of Package (Section 12.0): The site transportation certification official shall be responsible for ensuring that the dose rates measured for the package do not exceed those limits set in Section 1.2.3 of the SAR.

- Date of ICV Closure: The site transportation certification official shall record the date that the ICV is closed on the form.

- Transportation Certification Official: The site transportation certification official shall sign and date this document upon assuring that the transportation requirements for the TRUPACT-II are met and the payload is qualified for transport.

13.4 Dunnage

Dunnage is not required in TRUPACT-II shipments when the fourteen-drum or two-SWB configuration is used. However, a shipper must use dunnage to complete one of the above configurations if too few payload containers are available that meet all payload container requirements and transportation requirements. An empty, 55-gallon, metal drum or an empty SWB may be used as dunnage. Dunnage drums may be assembled into a seven-pack of only dunnage drums, or they may be assembled into a seven-pack with drums of waste that meet all applicable requirements. In the latter case, the Dunnage Drum(s) must be labeled with a unique package identification number like the waste drums because of the WIPP Waste Information System. All dunnage containers must be labeled "EMPTY" or "DUNNAGE."

13.5 References

13.5.1 U.S. DOE, "TRUPACT-II Content Codes (TRUCON)," Rev. 3, July 1989, DOE/WIPP 89-004.

APPENDIX D

DEFINITIONS

DEFINITIONS

Analytical Category	Decay heat calculated using analytical equations associated with the placement of a waste package in TRUPACT-II.
Audit	A systematic check to predetermined requirements to assess the quality of operation in some function or activity.
Bin	A special waste container to be used in the Test Phase. All bins will be overpacked in a standard waste box for transport in TRUPACT-II.
Canister	A cylindrical container for remote-handled waste affording physical containment but not shielding. The waste remains in the canister during handling and disposal.
Cask	A shielded shipping container for RH waste.
Certification Plan	Plans developed by the waste generator/storage sites establishing the techniques to be used to certify waste. Separate certification plans may be used to meet the WIPP Operations and Safety Criteria, the RCRA requirements, or for the preparation of the waste for transportation. As an alternate, one plan may be prepared to cover all criteria and requirements. Along with each technical plan, the supporting QA requirements must also be developed. These may be integrated into the certification plan or exist as a separate document.

DEFINITIONS

Certified Waste	Waste packages that have been verified to meet the criteria of this document.
Contact-Handled Transuranic Waste (CH–TRU Waste)	TRU waste whose external surface dose rate does not exceed 200 mrem per hour.
Contamination	Undesirable material present on surfaces; either transferable or fixed.
Corrective Action	Measures taken to rectify conditions adverse to quality and, where necessary, to preclude repetition.
Corrosive Materials	Corrosive materials are those defined as such by 40 CFR § 261.22.
Criteria	Limiting parameters specified by the DOE.
Decontamination	The removal of contamination from facilities or equipment.
Disposal	Emplacement of a material with no intent of retrieval.
Emplacement	At the WIPP, the placing of TRU wastes within the repository.
Free Liquid	Liquid that is not sorbed into a host material such that it could spill or drain from its container.

DEFINITIONS

Hot Cell	A heavily shielded compartment containing remote handling equipment for highly radioactive materials.
Immobilized Materials	Materials that are fixed in a matrix.
Nonconformance	A deficiency in characteristic, documentation, or procedure that renders the quality of an item or activity unacceptable or indeterminate.
Operating Limit	A limit established by design or condition which if exceeded may cause violation of existing criteria.
Overpack	A container placed around another container to control contamination, or enclose a damage container.
Packaging	A transportation device consisting of an assembly of components necessary to ensure compliance with the requirements of Titles 49 CFR Part 173, Subpart I and 10 CFR Part 71.
Performance Assessment	The process of assessing the compliance of a deep geologic waste repository with the containment requirements of 40 CFR Part 191, Subpart B.
Pyrophoric	Materials which may ignite spontaneously in air.

DEFINITIONS

Quality Assurance (QA)	All those planned and systematic actions necessary to provide adequate confidence that a structure, system, or component will perform satisfactorily in service.
Quality Assurance Plan	A description of the quality related requirements, responsibilities, activities, and methods of implementation, which are applicable to a specific task and the relationship of the plan to the site's QA Program.
Quality Assurance Program Plan (QAPP)	The controlling document which identifies the quality of data necessary to meet the specific objectives associated with the DOE WIPP Experimental-Waste Characterization Program.
Quality Assurance Project Plan (QAPjP)	A document describing the application of the QAPP to a specific project, site or laboratory.
Quality Control (QC)	Those activities that provide a means to control and measure the characteristics of a structure, system, or component to established requirements.
Residual Liquid	Free liquids in quantities of less than 1 volume percent of the waste container that result from: liquid residues remaining in well-drained internal containers; condensation of moisture; and liquid separation resulting from sludge/resin setting.

DEFINITIONS

Retrievable	When used in association with waste emplacement in the WIPP, it describes waste storage in a manner designed for retrieval of the waste.
Remote–Handled Transuranic Waste (RH-TRU)	Packaged TRU waste whose external surface dose rate exceeds 200 mrem per hour. For the WIPP there is an upper limit of 1000 rem per hour.
REM	Roentgen Equivalent Man. Unit used to express human biological doses as a result of exposure to various types of ionizing radiation. For the WIPP use it is the sum of the gamma and neutron doses from a waste package.
Requirements	Parameters imposed by regulations or statutes from external organizations (e.g., EPA, NRC, etc.).
Shipper	A generator or storage site which places a transport packaging in shipment.
Source Term	A description of the radionuclides or other hazardous materials which are present in a location of interest.
Specific Activity	Radioactivity per unit weight of radioactive material (Curie/gram).

DEFINITIONS

Standard Waste Box (SWB)	A waste container authorized for use with TRUPACT–II transportation packages that meets Department of Transportation (DOT) Specification 7A Type A.
Test Category	Decay Heat determination from testing of individual waste packages for hydrogen generation prior to placement in TRUPACT-II.
Transportation Container	The reusable shipping container for transport of waste packages or assemblies of waste packages. i.e., TRUPACT-II or RH Cask.
Transportation Packaging	Transportation containers and their contents.
Transportation: Waste Package Requirements	Waste package requirements related to transportation.
Transuranic (TRU)	Pertaining to elements with atomic numbers greater than 92, i.e., neptunium, plutonium, americium, and curium.
TRUPACT–II Content Codes (TRUCON)	Document containing a description of the waste stream, waste form and package configuration for each waste content code authorized for shipment in TRUPACT-II.
Transuranic Waste (TRU Waste)	Waste contaminated with alpha-emitting radionuclides with an atomic number of greater than 92 and half-lives greater than 20 years in concentrations greater than 100 nanocuries per gram.

DEFINITIONS

TRU Mixed Waste	TRU waste that also includes hazardous materials as identified in 40 CFR 261, Subparts C and D
TRUPACT-II	An NRC certified Type B transportation packaging used for transportation of transuranic contact-handled wastes.
TRUPACT-II Authorized Methods for Payload Control (TRAMPAC)	This document lists the authorized methods for meeting the TRUPACT-II payload requirements. It is Appendix 1.3.7 of the TRUPACT-II SARP.
TRUPACT-II Safety Analysis Report for Packaging	The safety analysis report for the TRUPACT-II.
Verification	The act of reviewing, inspecting, testing, checking, auditing, or otherwise determining and documenting whether items, processes, services, or documents conform to specified requirements.
Volume Percent	As used in this document, it is defined as the volume of the item is question compared to the volume of the waste container.
Waste Acceptance Criteria (WAC)	The criteria used to determine if waste packages are acceptable for receipt at the WIPP.
Waste Container	The disposable container for waste materials.

DEFINITIONS

Waste Form	The physical form of the waste such as sludges, combustibles, metals, etc.
Waste Package	Waste containers, such as drums and SWBs, and their contents.
Waste Package Assembly	An assembly of waste packages, such as a seven pack of drums, that is intended to be handled and emplaced as a single unit.